RCPI Working Group on Traffic Review 2015 in consideration of the evidence of standards to be set by Sláinte agus Tiomáint Medical Fitness to Drive Guidelines 2016
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Neurological disorders

   Driving after traumatic brain injury. Novack T, Lopez E.
   PMID: 25813892 [PubMed - indexed for MEDLINE]

   Decisions about driving for persons with neurodegenerative conditions. Akinwuntan AE, Devos H.
   PMID: 25813891 [PubMed - indexed for MEDLINE]

   Drivers with dementia in Japan: required public support under strict legal restrictions. Mizuno Y(1), Arai Y.
   PMID: 25800919 [PubMed - indexed for MEDLINE]

   We can predict when driving is no longer safe for people who have HD using standard neuropsychological measures. Hennig BL(1), Kaplan RF(1), Nowicki AE(1), Barclay JE(1), Gertsberg AG(1).

BACKGROUND:
Early cognitive dysfunction in Huntington's Disease (HD) is typically of a subcortical frontal executive type, with bradyphrenia, poor spatial and working memory, poor planning and organization, a lack of judgment, and poor mental flexibility. Although there is literature suggesting a correlation between deficits in speed of processing, working memory and executive function on driving competency, there is little direct evidence comparing these declines on tests to actual driving skills.

OBJECTIVE:
The current study examines the utility of specific neuropsychological measures in predicting actual driving competency in patients with HD.

METHODS:
Fifty-two patients at the UConn Health HD Program underwent yearly neuropsychological evaluations and were included in this study. Four scales were chosen a priori to predict driving impairment because of their reported relationship to driving ability. Within each test category, subjects who scored below the threshold suggestive of neurological impairment were found to have results within the impaired range (1.5 standard deviations below corrective normative data). A referral to the Connecticut Department of Motor Vehicles (DMV) for a driving evaluation was subsequently made on patients who were found impaired on any two of these tests.

RESULTS:
The authors found a strong relationship between scores on a simple battery of four neuropsychological tests and driving competency.

CONCLUSIONS:
This short battery may prove of pragmatic value for clinicians working with people with HD and their families.

PMID: 25575956 [PubMed - indexed for MEDLINE]
The neural correlates of road sign knowledge and route learning in semantic dementia and Alzheimer's disease.


**BACKGROUND:**
Although there is a growing body of research on driving and Alzheimer's disease (AD), focal dementias have been understudied. Moreover, driving has never been explored in semantic dementia (SD).

**METHODS:**
An experimental battery exploring road sign knowledge and route learning was applied to patients with SD and AD selected in the early-moderate stage of disease and to a group of healthy participants. Neuropsychological data were correlated to cerebral hypometabolism distribution, investigated by means of positron emission tomography.

**RESULTS:**
The two dementias showed opposite profiles. Patients with SD showed poor road sign knowledge and normal performance in route learning. By contrast, patients with AD showed low performance in route learning test with preservation of semantic knowledge of road signs. In SD, there was a correlation of semantic knowledge impairment with hypometabolism in the left temporolateral cortex. No correlation between the AD region of interests (ROIs) and the relevant behavioural indices was found, while in the whole-brain analysis there was a significant correlation between route learning and the superior frontal gyrus. DISCUSSION AND CONCLUSIONS: For the first time, driving skills were explored in SD, and it is showed a differential profile from the one detected in AD. We demonstrate that the left anterior temporal cortex is implicated in road sign knowledge, while a distributed cortical network, including the frontal cortex, is likely to process route learning.

**PMID:** 25535307 [PubMed - indexed for MEDLINE]

Dementia, driving retirement and decision aids.
PMID: 25516909 [PubMed - indexed for MEDLINE]

On-road driving impairments and associated cognitive deficits after stroke.
Devos H(1), Tant M, Akinwuntan AE.

**BACKGROUND:**
Little is known about the critical on-road driving skills that get affected after a stroke. The purpose of this study was to investigate the key on-road driving impairments and their associated cognitive deficits after a stroke. A second aim was to investigate if lateralization of stroke impacts results of the cognitive and on-road driving tests.

**METHODS:**
In this cross-sectional study, 99 participants with a first-ever stroke who were actively driving prior to stroke underwent a cognitive battery and a standardized road test that evaluated 13 specific on-road driving skills. These on-road driving skills were mapped onto an existing, theoretical framework.
that categorized the on-road items into hierarchic clusters of operational, tactical, visuo-integrative, and mixed driving skills. The total score on the road test and the on-road decision, made by a certified fitness-to-drive expert, decided the main outcome. The critical on-road driving skills predicting the on-road decision were identified using logistic regression analysis. Linear regression analysis was employed to determine the cognitive impairments leading to poor total on-road scores. Analyses were repeated for right- and left-sided strokes.

RESULTS:
In all, 37 persons scored poorly on the road test. These participants performed worse in all hierarchic clusters of on-road driving. Performances on the operational cluster and the visuo-integrative cluster best predicted on-road decisions (R(2) = 0.60). 'Lane changing' and 'understanding, insight, and quality of traffic participation' were the critical skill deficits leading to poor performance on the road test (R(2) = 0.65). Divided attention was the main determinant of on-road scores in the total group (R(2) = 0.06). Participants with right-sided stroke performed worse on visual field, visual neglect, visual scanning, visuo-constructive skills, and divided attention compared with those with left-sided stroke. Divided attention was the main determinant of total on-road scores in the right-sided stroke group (R(2) = 0.10). A combination of visual scanning, speed of processing, and executive dysfunction yielded the best model to predict on-road scores in left-sided strokes (R(2) = 0.46). CONCLUSIONS: Poor performance in the road test after stroke is determined by critical operational and visuo-integrative driving impairments. Specific and different driving evaluation and training programs are needed for right- and left-sided strokes.

PMID: 25359174 [PubMed - indexed for MEDLINE]

Predictors of on-road driver performance following traumatic brain injury.
Ross PE(1), Ponsford JL(2), Di Stefano M(3), Spitz G(2).

OBJECTIVE:
To examine assessment outcomes and factors associated with passing an occupational therapy (OT) on-road driver assessment after traumatic brain injury (TBI).

DESIGN:
Retrospective analysis of outcomes of on-road driver assessment completed by persons with TBI over an 8-year period.

SETTING:
Inpatient and outpatient rehabilitation hospital.

PARTICIPANTS:
A consecutive sample of individuals (N=207) with mild to severe TBI who completed an on-road driver assessment and were assessed at least 3 months postinjury.

INTERVENTION:
Not applicable.

MAIN OUTCOME MEASURE:
Outcome of on-road driver assessment.
**RESULTS:**
Of the drivers with TBI, 66% (n=137) passed the initial on-road driver assessment (pass group), whereas 34% (n=70) required on-road driver rehabilitation and/or ≥1 on-road assessment (rehabilitation group). After driver rehabilitation, only 3 participants of the group did not resume driving. Participants who were men, had shorter posttraumatic amnesia (PTA) duration, had no physical and/or visual impairment, and had faster reaction times were significantly more likely to be in the pass group. In combination, these variables correctly classified 87.6% of the pass group and 71.2% of the rehabilitation group.

**CONCLUSIONS:**
PTA duration proved to be a better predictor of driver assessment outcome than Glasgow Coma Scale score. In combination with the presence of physical/visual impairment and slowed reaction times, PTA could assist clinicians to determine referral criteria for OT driver assessment. On-road driver rehabilitation followed by on-road reassessment were associated with a high probability of return to driving after TBI.

**PMID:** 25316183  [PubMed - indexed for MEDLINE]

Driving habits in patients with dementia: a report from Alzheimer’s disease assessment units in northern Italy.
Mauri M, Sinforiani E, Cuzzoni MG, Bono G, Zucchella C.

The aim of this study was to characterize the driving behavior of a sample of patients with dementia. Demographic and clinical characteristics and parameters considered to be the most significant predictors of driving ability were collected. Of the total 198 patients enrolled, 172 were still driving. Many subjects (30-65%) were found to have modified their driving habits (reducing driving time and mileage, avoiding driving at night and during rush hours, sticking to familiar routes). The patients’ own rating of their driving ability was significantly higher than their caregivers’ rating (51% versus 29%). Crash history was not a significant variable. The patients’ restriction of their driving increased significantly (p<0.01) with age and increasing worsening of cognitive, functional and behavioral variables. In the absence of a gold standard for determining fitness to drive, the patients’ driving habits were self-regulated and, in particular, regulated by their caregivers. Age and degree of dementia can be considered among the best predictors of driving safety.

**PMCID:** PMC4198158
**PMID:** 25306120  [PubMed - indexed for MEDLINE]

Racial differences in poststroke rehabilitation utilization and functional outcomes.
Ellis C(1), Boan AD(2), Turan TN(3), Ozark S(3), Bachman D(3), Lackland DT(3).

**OBJECTIVE:**
To examine racial differences in poststroke rehabilitation utilization and functional outcomes.

**DESIGN:**
Observational follow-up study.
SETTING:
Designated stroke center.

PARTICIPANTS:
Stroke survivors (N=162; 106 whites and 56 blacks) surveyed at 1 year poststroke.

INTERVENTION:
Not applicable.

MAIN OUTCOME MEASURES:
Twenty-question measure of activities of daily living (ADL) and instrumental activities of daily living (IADL) performance, life participation, and driving. One-year follow-up data collected from stroke survivors as part of the Stroke Education and Prevention-South Carolina Project were examined for racial disparities in rehabilitation utilization and functional outcomes.

RESULTS:
Analyses revealed no significant differences between blacks and whites for rehabilitation utilization. In multivariate comparisons controlling for stroke severity, blacks were less likely to report independence in overall functional performance and domain-specific measures of toileting, walking, transportation, laundry, and shopping. Blacks also reported less independence in driving at 1-year follow-up.

CONCLUSIONS:
Blacks were less likely to report independence in performing ADL and IADL at 1 year poststroke after controlling for stroke severity. Racial disparities were reported in ADL and IADL performance despite a lack of racial differences in rehabilitation utilization. Future studies are needed to further understand the reason for this disparity in reported functional independence.

PMID: 25223490 [PubMed - indexed for MEDLINE]

Car driving performance in hemianopia: an on-road driving study.
de Haan GA(1), Melis-Dankers BJ(2), Brouwer WH(3), Bredewoud RA(4), Tucha O(5), Heutink J(1).

PURPOSE:
To study driving performance in people with homonymous hemianopia (HH) assessed in the official on-road test of practical fitness to drive by the Dutch driver’s licensing authority (CBR).

METHODS:
Data were collected from a cohort (January 2010-July 2012) of all people with HH following the official relicensure trajectory at Royal Dutch Visio and the CBR in the Netherlands. Driving performance during the official on-road tests of practical fitness to drive was scored by professional experts on practical fitness to drive, using the visual impairments protocol and a standardized scoring of visual, tactical and operational aspects. Age ranged from 27 to 72 years (mean = 52, SD = 11.7) and time since onset of the visual field defect ranged from 6 to 41 months (mean = 15, SD = 7.5).

RESULTS:
Fourteen (54%) participants were judged as fit to drive. Besides poor visual scanning during driving, specific tactical, and operational weaknesses were observed in people with HH that were evaluated as unfit to drive. Results suggest that judgement on practical fitness to drive cannot be based on solely the visual field size. Visual scanning and operational handling of the car were found to be
more impaired with longer time not driven, while such an effect was not found for tactical choices during driving.

CONCLUSIONS:
Training programs aimed at improving practical fitness to drive in people with HH should focus on improving both visual scanning, as well as driving aspects such as steering stability, speed adaptation, and anticipating environmental changes.

PMID: 25212777  [PubMed - indexed for MEDLINE]

Transition: driving and exercise.
Nashef L(1), Capovilla G, Camfield C, Camfield P, Nabbout R.

There are many social aspects to consider at the time of transition of adolescents with epilepsy. The role of both pediatric and adult health care providers includes education and guidance within the larger framework of family, society, and country. This section focuses on driving and exercise considerations for those undergoing transition.

PMID: 25209086  [PubMed - indexed for MEDLINE]

Drug-resistant MS spasticity treatment with Sativex® add-on and driving ability.
Freidel M(1), Tiel-Wilck K, Schreiber H, Prechtl A, Essner U, Lang M.

OBJECTIVE:
The aim of the present observational study was to determine the effects of a delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD) oromucosal spray (Sativex® spray), brand name Sativex®, indicated for drug-resistant MS spasticity, on the driving ability of treated MS patients.

METHODS:
The study was conducted over a period of 4-6 weeks. Thirty-three MS patients with moderate to severe treatment-resistant spasticity and planned to begin add-on treatment with Sativex® were enrolled at three specialized MS centres in Germany. A set of five driving test procedures from a validated computerized test battery was used to evaluate the driving ability of eligible patients. Tests were performed by patients at baseline and repeated after 4-6 weeks of treatment with Sativex® oromucosal spray. According to German normative data, the test thresholds achieved by the general population served as a reference to allow for a fitness/unfitness to drive classification.

RESULTS:
Patients showed comparable driving test results at baseline and at final visits. Only two patients changed classification shifting from 'unfit' to drive to 'fit' and vice versa. The mean severity of spasticity, as self-reported by the patients, improved with statistical significance. Sativex® was generally well tolerated.

CONCLUSIONS:
Treatment of MS patients with Sativex® does not negatively impact on driving ability and may improve moderate to severe treatment-resistant MS spasticity.

PMID: 25208898  [PubMed - indexed for MEDLINE]
Physician sex is a predictor of reporting drivers with mild cognitive impairment and mild dementia to transportation authorities.  
PMID: 25180390 [PubMed - indexed for MEDLINE]

Syncope: risk stratification and clinical decision making.  
Peeters SY, Hoek AE, Mollink SM, Huff JS.  
Syncope is a common occurrence in the emergency department, accounting for approximately 1% to 3% of presentations. Syncope is best defined as a brief loss of consciousness and postural tone followed by spontaneous and complete recovery. The spectrum of etiologies ranges from benign to life threatening, and a structured approach to evaluating these patients is key to providing care that is thorough, yet cost-effective. This issue reviews the most relevant evidence for managing and risk stratifying the syncope patient, beginning with a focused history, physical examination, electrocardiogram, and tailored diagnostic testing. Several risk stratification decision rules are compared for performance in various scenarios, including how age and associated comorbidities may predict short-term and long-term adverse events. An algorithm for structured, evidence-based care of the syncope patient is included to ensure that patients requiring hospitalization are managed appropriately and those with benign causes are discharged safely.  
PMID: 25105200 [PubMed - indexed for MEDLINE]

Incidental visual field loss: ethical considerations in assessing and reporting ability to drive.  
Szewka AJ, Newman N.  
Driving safety is an issue frequently encountered in the neurology clinic, particularly as it pertains to cognitive decline, vision loss, and motor limitations. This case illustrates the ethical dilemmas associated with determining driving safety, particularly those associated with an incidentally found congenital visual field abnormality. The authors discuss the issues involved with overruling patient autonomy for the principle of beneficence and the ethics of reporting patients with unsafe vision to authorities.  
PMID: 25099108 [PubMed - indexed for MEDLINE]

The mini-mental state examination, clinical factors, and motor vehicle crash risk.  
OBJECTIVES:  
To examine the association between Mini-Mental State Examination (MMSE) score and motor vehicle crash (MVC) risk in a large cohort of community-dwelling participants with cardiovascular disease (CVD) or diabetes mellitus.
DESIGN: Prospective observational study.

SETTING: Participants enrolled in the Ongoing Telmisartan Alone and in Combination With Ramipril Global End Point Trial and Telmisartan Randomized Assessment Study in ACE Intolerant Subjects with Cardiovascular Disease clinical trial, which included individuals aged 55 and older with CVD or diabetes mellitus.

PARTICIPANTS: Totally 17,538 frequent drivers (defined as driving at least once per week) who had completed a baseline MMSE.

MEASUREMENTS: Involvement in a MVC as the driver.

RESULTS: Baseline MMSE score was divided into four categories: 30, 27-29, 24-26, and <24. The median MMSE score was 29 (interquartile range 27-30), and 726 (4.1%) has a MMSE score of less than 24 at baseline. After a mean follow-up of 4.5 years, 1,068 (6.1%) participants were drivers in a MVC. Lower scores were not associated with future MVCs (MMSE score 29-27, hazard ratio (HR)=1.06, 95% confidence interval (CI)=0.93-1.22; MMSE score 26-24, HR=0.96, 95% CI=0.78-1.19; MMSE score<24, HR=0.72, 95% CI=0.50-1.05) on multivariable analysis. A MVC within the previous 2 years (HR=2.68, 95% CI=2.29-3.13) was the strongest predictor of future MVCs. Other clinical factors associated with greater MVC risk were depression, falls within the previous year, sleep apnea, and lower baseline systolic blood pressure.

CONCLUSION: In a population of frequent drivers, the MMSE does not predict MVCs. Other clinical factors have a stronger association with MVC risk.

PMID: 25040793 [PubMed - indexed for MEDLINE]

18. J R Coll Physicians Edinb. 2014;44(1):4-7. doi: 10.4997/JRCPE.2014.101. Responsible management of motor vehicle drivers with dementia. Yates M(1), Ibrahim JE. Comment in J R Coll Physicians Edinb. 2014;44(4):349. When Bridget Driscoll, a 44-year-old mother of two died after being struck by a motor vehicle, considered to be the first motor vehicle fatality in UK and possibly the world, the coroner stated 'I trust this sort of nonsense will never happen again'.1 Sadly, the coroner, medical practitioners and general public would be deeply and repeatedly disappointed. It was 1896. Motor vehicles were a curiosity. Drivers did not undergo any form of testing, be it medical fitness, driving ability or otherwise, and there were no licensing regulatory agencies. By 2010, road injury was the ninth most common cause of death globally (1.3 million deaths per annum) and dementia the fourth most common in high income countries.2 By 2030 the number of all licensed UK drivers who are 65 years or older will increase by almost 50% to almost one in every four drivers.3 If the juxtaposition of driving with dementia in an ageing population is not already a contentious social, political and medical issue, it certainly will become so.

PMID: 24995438 [PubMed - indexed for MEDLINE]

For most people driving is essential for mobility to maintain independence and to take part in activities of daily living. Ageing per se does not impair driving but in cases of medical conditions, such as cognitive impairment and dementia, driving safety can be impaired. Thus clinicians are often called upon to counsel patients and to make recommendations on their fitness to drive. Dementia in the early stages of the illness does not necessarily preclude driving ability. Patients with mild dementia pose a risk with respect to traffic safety and an individual assessment with regular follow-up investigations should be made. Especially patients with frontotemporal dementia should cease driving early in the course of the disease. Screening tests that focus on visuospatial abilities, attention and executive functions can improve the prediction of driving ability in patients with dementia. In many cases an on-road driving test to evaluate the ability to compensate for functional impairments is essential. In order to preserve personal autonomy as long as possible patients should be individually counselled taking into account driving experience, insight into functional impairments, personality and the capability to compensate for functional disabilities.

PMID: 24973013 [PubMed - indexed for MEDLINE]

[Driving ability with cerebral perfusion disorders]. [Article in German]
Marx P(1).

In Germany expert testimony on driving ability requires knowledge of the corresponding legislation, the guidelines for expertises on driver aptitude and a qualification in traffic medicine. The testimony should clearly identify handicaps with regard to driving, give estimates on the risks of a sudden loss of the driving capability by stroke recurrence or epileptic seizures, and also consider personal attitudes, such as inadequate behaviour and lack of insight. Physical handicaps can often be compensated for by restraints, such as vehicle modifications and restrictions, such as daylight driving only. The testimony must also give estimates on the risks of a sudden loss of the driving capability by stroke recurrence or epileptic seizures. Two models are proposed by which an estimate of harmful traffic accidents due to stroke recurrence can be made.

PMID: 24943360 [PubMed - indexed for MEDLINE]

Epub 2014 Jun 14.
Could deep brain stimulation help with driving for patients with Parkinson's?
Buhmann C(1), Gerloff C.

For mobility impaired people with Parkinson's disease (PD), driving a car is important to maintain independency. But driving ability is getting worse with disease progression. Meanwhile surgical treatment with deep brain stimulation (DBS) of the subththalamic nucleus is done routinely in advanced PD, but it is unknown how DBS might affect driving. In a driving simulator setting, we found PD patients undergone DBS surgery to drive safer than even less clinically affected PD patients treated with medication alone. Furthermore, patients with DBS surgery drove better under stimulation than under medication. In conclusion, DBS of the subthalamic nucleus appears to be beneficial for driving in PD patients, potentially due to non-motor effects on controlling the vehicle in the simulator setting. Nevertheless, results of this first pilot study on driving in PD patients with DBS should not encourage patients or physicians to consider DBS only to improve or regain driving competence.

PMID: 24930934 [PubMed - indexed for MEDLINE]
Neuropsychological performance, brain imaging, and driving violations in multiple sclerosis.
Dehning M(1), Kim J(2), Nguyen CM(1), Shivapour E(1), Denburg NL(3).

OBJECTIVE:
To examine the relationship between third ventricular width, a measure of thalamic brain atrophy, and motor vehicle violation type and frequency in a cohort of patients with multiple sclerosis (MS).

DESIGN:
Retrospective cohort study.

SETTING:
Tertiary care university hospital.

PARTICIPANTS:
Thirty-five individuals with clinically confirmed relapsing-remitting multiple sclerosis and 35 age-, sex-, and education-matched community-dwelling healthy comparisons (N=70). Participants were aged between 25 and 65 years.

INTERVENTIONS:
Not applicable.

MAIN OUTCOME MEASURES:
Data on motor vehicle violations were obtained from an online database (Iowa Courts Online). The violations were categorized as follows: (1) speeding, (2) nonmoving safety, (3) administrative, (4) alcohol-related offense, (5) moving safety, and (6) total violations. Neuropsychological performance in all major cognitive domains was obtained. Thalamic atrophy for the patients with MS was determined via third ventricular width measurement.

RESULTS:
The MS group had a greater number of overall violations, administrative violations, and nonmoving safety violations. The groups differed on neuropsychological tasks measuring visuospatial skills, speeded language, learning, and executive functioning, after controlling for affective symptoms. Third ventricular width was associated with total violations as well as moving safety violations. Finally, third ventricular width accounted for a significant variance in driving violation frequency above and beyond demographic variables and neuropsychological factors.

CONCLUSIONS:
There is an increased frequency of motor vehicle violations among patients with multiple sclerosis, and the number of violations can be predicted by thalamic brain atrophy.

PMID: 24929025 [PubMed - indexed for MEDLINE]
OBJECTIVE:
In the United Kingdom and other European Union countries guidelines for driving following a first unprovoked seizure require the risk of another seizure in the next year to be less than 20%. Using data from one clinical trial, we previously developed a prognostic model to inform driving guidelines. The objective of this work is to externally validate our published model and demonstrate its generalisability.

METHODS:
A cohort of 620 people with a first unprovoked seizure was used to develop the original model which included variables for aetiology, first degree relative with epilepsy, seizures only while asleep, electroencephalogram, computed tomography or magnetic resonance scan result, and treatment policy. The validation cohorts consisted of 274 (United Kingdom), 305 (Italy), and 847 (Australia) people. The model was evaluated using discrimination and calibration methods. A covariate, missing from the Italian dataset, was handled via five imputation methods. Following external validation, the model was fitted to a pooled population comprising all validation datasets and the development dataset. The model was stratified by dataset.

RESULTS:
The model generalised relatively well. All methods of imputation performed fairly similarly. At six months, the risk of a seizure recurrence following a first ever seizure, based on the pooled datasets, is 15% (95% CI: (12% to 18%)) for patients who are treated immediately and 18% (95% CI: (15 to 21%)) otherwise. Individuals can be reliably stratified into risk groups according to the clinical factors included in the model.

SIGNIFICANCE:
Our prognostic model, used to inform driving regulations, has been validated and consequently has been proven as a valuable tool for predicting risk of seizure recurrence following a first seizure in people with various combinations of risk factors. Additionally, there is evidence to support one worldwide overall prognostic model for risk of second seizure following a first.

PMCID: PMC4053525 PMID: 24919184 [PubMed - indexed for MEDLINE]

Post-stroke driving: examining the effect of executive dysfunction.
Motta K(1), Lee H(2), Falkmer T(3).

INTRODUCTION:
Executive dysfunction can refer to both neurocognitive deficits and behavioral symptoms that include impaired judgment, slow decision making, disorganization, impulsiveness, and risk-taking behaviors. Executive dysfunction is relatively common in the post-stroke population but is often undetected. The impact of executive dysfunction on post-stroke driving is unclear but it may pose a risk to affected drivers and other road users.

AIM:
The aim of this study was to investigate the relationship between executive functioning following stroke and driving performance.

METHODOLOGY:
A case-control study design was used. Purposive sampling was used to recruit stroke participants (n=19) and healthy controls (n=22). Participants were screened using a battery of psychometric assessments including the Montreal Cognitive Assessment and the Benton Judgment of Line.
Orientation. Driving performance was assessed using the STISIM driving simulator. Executive function was assessed using the Behavioural Assessment of the Dysexecutive Syndrome (BADS) and the Trail Making Test Part B.

RESULTS:
The control participants performed better than the stroke participants on the driving assessment and psychometric assessments. There was an association between the scores of the Trail Making Test Part B (Rho=0.34, p=0.034) and the Key Search Test of the BADS (Rho=-0.61, p=0.005), and the driving assessment scores. However, there was no association between the overall BADS scores and the driving assessment scores of the stroke participants.

CONCLUSIONS:
The stroke participants underperformed in the driving assessment and the psychometric assessments that detected neurocognitive deficits, which included executive function. The Trail Making Test Part B and Key Search Test of the BADS were related to identify participants' deterioration in driving performance. Practical Applications: In clinical practice, the latter could be used as an indication of a post-stroke driver's performance.

PMID: 24913483  [PubMed - indexed for MEDLINE]

[Epilepsy and driving]. [Article in Japanese]  
Matsuura M.

In Japan, the Road Traffic Act was amended in June 2013, including new penalty to false statement in a disease condition declaration form, and new voluntary notification system for a doctor who is aware that a person is at high risk for traffic accident and in possession of a driver license. Moreover, New Criminal Law Act was established in November 2013, including a prison sentence of up to 15 years for persons, who under the influence of specific drugs or diseases, causing death or injury to other persons by driving a motor vehicle. Both laws are supposed to be enforced during 2014, after additional resolutions including the review of the laws after five years, considerations so as not to create discrimination due to diseases, etc are examined.

PMID: 24912298  [PubMed - indexed for MEDLINE]

[Principles of evaluating driving ability for neurological and psychiatric diseases]. [Article in German]  
Brunnauer A(1), Widder B, Laux G.

If attending physicians and psychologists recognize restricted or a lack of driving ability they are obliged to inform their patients appropriately. In Germany the legal basis for assessing driving ability is the "Fahrerlaubnis-Verordnung" (FeV, driving licence act), supplemented by guidelines for evaluating driving ability. In each individual case it has to be clarified whether and to what extent permanent or paroxysmally occurring disorders affect driving ability and whether lack of insight ability or personality defects are a threat to driving safety. In addition, it has to be considered whether compensation opportunities exist that enable restricted driving ability. If an expert opinion is requested by the driving licence authority in Germany the medical expert must have a specific qualification and should not be the attending physician.

PMID: 24906538  [PubMed - indexed for MEDLINE]

The driving performance of patients with dizziness and vertigo has gained only minor attention so far. Patients with permanent vestibular loss or with episodic vestibular symptoms can experience difficulties in driving a motor vehicle. The presence of a chronic or episodic syndrome presenting with dizziness and/or vertigo does not automatically exclude the ability to drive. Assessment of driving performance should consider the degree of the deficits and compensation in chronic dysfunction and the severity and frequency of attacks, prodromes and triggers of symptoms in episodic disorders.

PMID: 24906537 [PubMed - indexed for MEDLINE]


Driving is an important issue for young patients, especially for those whose walking capacity is impaired. Driving might support the patient’s social and vocational participation. The question as to whether a patient with multiple sclerosis (MS) is restricted in the ability to drive a car depends on neurological and neuropsychological deficits, self-awareness, insight into deficits and ability to compensate for loss of function. Because of the enormous variability of symptoms in MS the question is highly individualized. A practical driving test under supervision of a driving instructor (possibly accompanied by a neuropsychologist) might be helpful in providing both patient and relatives adequate feedback on driving abilities.

PMID: 24906536 [PubMed - indexed for MEDLINE]


Driver rehabilitation: a systematic review of the types and effectiveness of interventions used by occupational therapists to improve on-road fitness-to-drive.

Unsworth CA(1), Baker A(2).

OBJECTIVE:
Driver rehabilitation has the potential to improve on-road safety and is commonly recommended to clients. The aim of this systematic review was to identify what intervention approaches are used by occupational therapists as part of driver rehabilitation programmes, and to determine the effectiveness of these interventions.

METHOD:
Six electronic databases (MEDLINE, CINAHL, PsycInfo, Embase, The Cochrane Library, and OTDBase) were searched. Two authors independently reviewed studies reporting all types of research designs and for all patient populations, provided the interventions could be administered by occupational
therapists. The methodological quality of studies was assessed using the 'Downs and Black Instrument', and the level of evidence for each intervention approach was established using 'Centre for Evidence Based Medicine' criteria.

RESULTS:
Sixteen studies were included in the review. The most common type of intervention approach used was computer-based driving simulator training (n=8), followed by off-road skill-specific training (n=4), and off-road education programmes (n=3). Car adaptations/modifications were used in one of the included studies. There was significant variability between studies with regards to frequency, duration, and total number of intervention sessions, and the diagnoses of the participants. Of the four intervention approaches, there is evidence to support the effectiveness of off-road skill-specific training (with older clients), and computer-based driving simulator training (with both older clients and participants with acquired brain injury).

CONCLUSION: Three types of intervention approaches are commonly reported, however, there is limited evidence to determine to effectiveness of these in improving fitness-to-drive. Further research is required, with clients from a range of diagnostic groups to establish evidence-based interventions and determine their effectiveness in improving these clients' on-road fitness-to-drive.

PMID: 24906164 [PubMed - indexed for MEDLINE]

Driving and working with syncope.

Syncope is usually addressed in the Emergency Department (ED) by the doctor in charge of the clinical picture, i.e. the patient's risk is stratified, a diagnostic work-up is done and a prognosis is set. Patients are ultimately admitted to hospital or discharged. However, other aspects related to syncope may deeply affect their daily lives. These include how and when to return to work and to driving, the feelings about a recent loss of consciousness, and the potential relapse of syncope. This is particularly significant if the work setting is intrinsically hazardous. These patients need adequate clinical and psychological support. For patients with syncope, two main parameters should be considered regarding returning to work and to driving. The first is to evaluate the risk of syncope recurrence and the second is to consider the expected harm if syncope does indeed occur during these activities. In the present paper we detail the problem of driving (including professional driving) and work after syncope. We propose a new quantitative model that will guide the physician in stratifying the risk for patients who have had a previous syncope event. The new model considers the syncope recurrence risk, the job task duration, and features that facilitate a syncope during work. On the basis of these variables, the global risk index for a worker is calculated. Following appropriate validation, this method might help ED and occupational physicians in their decision making process with the goal of safely readmitting syncope patients to the workplace.

PMID: 24881013 [PubMed - indexed for MEDLINE]

Driving competences and neuropsychological factors associated to driving counseling in multiple sclerosis.
Badenes D(1), Garolera M(2), Casas L(1), Cejudo-Bolivar JC(3), de Francisco J(1), Zaragoza S(4), Calzado N(1), Aguilar M(1).
Multiple Sclerosis (MS) significantly impacts daily living activities, including car driving. To investigate driving difficulties experienced with MS, we compared 50 MS patients with minor or moderate disability and 50 healthy controls (HC) using computerized driving tests (the ASDE driver test and the Useful Field of View (UFOV) test) and neuropsychological tests. Inclusion criteria included being active drivers. We evaluated whether cognitive deterioration in MS is associated with the results of driving tests by comparing MS patients without cognitive deterioration with HC. The results indicated that the MS patients performed worse than the HCs in attention, information processing, working memory and visuomotor coordination tasks. Furthermore, MS patients with cognitive impairments experienced more difficulties in the driving tests than did the non-impaired MS patients. Motor dysfunction associated with MS also played an important role in this activity. The results of this study suggest that MS should be assessed carefully and that special emphasis should be placed on visuomotor coordination and executive functions because patients with minor motor disability and subtle cognitive impairments can pass measures predictive of driving safety.

PMID: 24867442 [PubMed - indexed for MEDLINE]

Health professionals' knowledge of driving restrictions following stroke and TIA: experience from a hyperacute stroke centre.
Batool S(1), Roberts AP(1), Kalra L(2), Manawadu D(2).

BACKGROUND AND PURPOSE:
Assessment of fitness to drive (FTD) is important after stroke or transient ischaemic attack (TIA) to ensure that neither patients nor public are at risk. This is particularly important in patients with TIAs or minor stroke as many are discharged directly from emergency departments by a range of health professionals. We assessed stroke-related FTD knowledge among physicians' and allied health professionals' (AHPs) treating patients with stroke at a hyperacute stroke centre.

METHODS:
Knowledge of FTD restrictions following a stroke or TIA for domestic and commercial use was assessed in 195 physicians and 45 AHPs using a multiple-choice questionnaire between January and December 2009. The effect of discipline, seniority, previous instruction in FTD restrictions and experience in stroke medicine on FTD was assessed.

RESULTS:
The correct driving restriction following stroke with domestic and commercial license was known to 29% and 73% of physicians, respectively. For AHPs, these figures were 36% and 20%. For TIA with domestic and commercial license, this was 37% and 43% for physicians, and 44% and 11% for AHPs. 25% of physicians and 11% of AHPs believed that no driving restrictions applied after a TIA. The correct office for reporting FTD was known to 180 (92%) doctors and 31 (69%) AHPs (p=0.0001); 160 (82%) physicians and 27 (60%) AHPs correctly identified that reporting was the patients' responsibility (p=0.001). FTD knowledge correlated with post in stroke (OR 3.2 (95% CI 1.6 to 6.2, p=0.001)) but not with seniority or previous FTD education.

CONCLUSIONS:
Health professionals providing stroke care showed limited knowledge of FTD regulations after minor stroke or TIA. Imparting accurate information on driving restrictions is an important but neglected part of stroke management.

PMID: 24785758 [PubMed - indexed for MEDLINE]
When is it safe to return to driving following first-ever seizure?
Brown JW(1), Lawn ND(2), Lee J(2), Dunne JW(2).

OBJECTIVES:
The risk of recurrence following a first-ever seizure is 40-50%, warranting driving restriction during
the early period of highest risk. This restriction must be balanced against the occupational,
educational and social limitations that result from patients being ineligible to drive. The
recommended duration of non-driving after a first seizure varies widely between jurisdictions,
influenced by various factors including the community perception of an acceptable relative level of
risk for an accident (the accident risk ratio; ARR). Driving restrictions may be based on individualised
risk assessments or across-the-board guidelines, but these approaches both require accurate data
on the risk of seizure recurrence.

METHODS:
1386 patients with first-ever seizure were prospectively analysed. Seizure recurrence was evaluated
using survival analysis. The duration of non-driving required for a range of risks of seizure recurrence
and ARRs was calculated. Additionally, the actual occurrence of seizures while driving was
prospectively determined during follow-up.

RESULTS:
For a risk of seizure recurrence to fall to 2.5% per month, corresponding to a monthly risk of a
seizure while driving of 1.04 per thousand and an ARR of 2.6, non-driving periods of 8 months are
required for unprovoked first-ever seizure, and 5 months for provoked first-ever seizure. Of patients
with a seizure recurrence, 14 (2%) occurred while driving, with the monthly risk falling to less than
1/1000 after 6 months.

CONCLUSIONS:
Our data provide a quantitative approach to decisions regarding a return to driving in patients with
first-ever provoked or unprovoked seizure.

PMID: 24769470 [PubMed - indexed for MEDLINE]

Cognitive impairment and dementia in Parkinson's disease: practical issues and management.
Emre M(1), Ford PJ, Bilgiç B, Uç EY.

Cognitive impairment and dementia pose particular challenges in the management of patients with
Parkinson's disease (PD). Decision-making capacity can render patients vulnerable in a way that
requires careful ethical considerations by clinicians with respect to medical decision making,
research participation, and public safety. Clinicians should discuss how future decisions will be made
as early in the disease course as possible. Because of cognitive, visual, and motor impairments, PD
may be associated with unsafe driving, leading to early driving cessation in many. DBS of the STN
and, to a lesser degree, globus pallidus interna (GPI) has consistently been associated with
decreased verbal fluency, but significant global cognitive decline is usually not observed in patients
who undergo rigorous selection. There are some observations suggesting lesser cognitive decline in
GPI DBS than STN DBS, but further research is required. Management of PD dementia (PDD) patients
involves both pharmacological and nonpharmacological measures. Patients with PDD should be
offered treatment with a cholinesterase inhibitor taking into account expected benefits and
potential risks. Treatment with neuroleptics may be necessary to treat psychosis; classical
neuroleptics, as well as risperidone and olanzapine, should be avoided. Quetiapine might be considered first-line treatment because it does not need special monitoring, although the strongest evidence for efficacy exists for clozapine. Evidence from randomized, controlled studies in the PDD population is lacking; selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors may be used to treat depressive features. Clonazepam or melatonin may be useful in the treatment of rapid eye movement behavior disorder.

PMID: 24757114  [PubMed - indexed for MEDLINE]


Driving is an important aspect of daily living and for many older people provides autonomy and psycho-social benefits. Cognitive impairment has been found to impact driving skills at the level of dementia, however, uncertainty remains around the impact of a diagnosis of the pre-dementia condition mild cognitive impairment. Current official guidelines are unclear, and assessment of fitness to drive can be problematic. This editorial examines current official guidance available to the clinician and problems with existing assessment as well as the current position of research specifically into MCI and driving, and considers future direction for research in this field.

PMID: 24709165  [PubMed - indexed for MEDLINE]


Veterans of Iraq and Afghanistan may experience driving-related challenges postdeployment, including more at-fault crashes. Causes may include defensive driving tactics learned for combat zones and consequences of traumatic brain injuries (TBIs) and posttraumatic stress disorder (PTSD). Tailoring driver interventions to meet Veterans’ needs requires an understanding of their driving perceptions. We explored the driving perceptions of five combat Veterans (4 men, 1 woman) with mild TBI and PTSD using grounded theory methods. Veterans participated in single, semistructured interviews during a comprehensive driving evaluation. Interviews were digitally recorded, transcribed verbatim, verified, and imported into NVivo 8 software for coding and analysis. Veterans were insightful about driving and identified specific environmental triggers for anxious driving, speeding, and road rage. Veterans used strategies to moderate driving behaviors, but continued to drive aggressively. Themes were used to develop a conceptual framework of driving postdeployment, laying the foundation for intervention studies.

PMID: 24699968  [PubMed - indexed for MEDLINE]

OBJECTIVE:
An advanced driver assistance system (ADAS) provided information about speed limits, speed, speeding, and following distance. Information was presented to the participants by means of a head-up display.

METHODS:
Effects of the information on speed and headway control were studied in a longer-term driving simulator study including 12 repeated measures spread out over 4 weeks. Nine healthy older drivers between the ages of 65 and 82 years and 9 drivers between the ages of 68 and 82 years diagnosed with Parkinson’s disease (PD) participated in the study. Within the 4 weeks, groups completed 12 consecutive sessions (10 with ADAS and 2 without ADAS) in a driving simulator.

RESULTS:
Results indicate an effect of ADAS use on performance. Removing ADAS after short-term exposure led to deterioration of performance in all speed measures in the group of drivers diagnosed with PD.

CONCLUSIONS:
These results suggest that provision of traffic information was utilized by drivers diagnosed with PD in order to control their speed.

PMID: 24697548 [PubMed - indexed for MEDLINE]


BACKGROUND:
An increasing number of older adults drive automobiles. Given that the prevalence of dementia is rising, it is necessary to address the issue of driving retirement. The purpose of this study is to evaluate how a self-administered decision aid contributed to decision making about driving retirement by individuals living with dementia. The primary outcome measure in this study was decisional conflict. Knowledge, decision, satisfaction with decision, booklet use and booklet acceptability were the secondary outcome measures.

METHODS:
A mixed methods approach was adopted. Drivers with dementia were recruited from an Aged Care clinic and a Primary Care center in NSW, Australia. Telephone surveys were conducted before and after participants read the decision aid.

RESULTS:
Twelve participants were recruited (mean age 75, SD 6.7). The primary outcome measure, decisional conflict, improved following use of the decision aid. Most participants felt that the decision aid: (i) was balanced; (ii) presented information well; and (iii) helped them decide about driving. In addition, mean knowledge scores improved after booklet use.

CONCLUSIONS:
This decision aid shows promise as an acceptable, useful and low-cost tool for drivers with dementia. A self-administered decision aid can be used to assist individuals with dementia decide about driving retirement. A randomized controlled trial is underway to evaluate the effectiveness of the tool.

PMCID: PMC3999924 PMID: 24642051 [PubMed - indexed for MEDLINE]
Vrkljan BH, Myers AM, Crizzle AM, Blanchard RA, Marshall SC.

BACKGROUND:
Assessing medical fitness to drive (FTD) can include both off- and on-road testing, although consistency of practice is unclear.

PURPOSE:
To examine actual practices being used to assess FTD at driver assessment centres (DACs) across Canada.

METHOD:
Surveys e-mailed to 90 DACs were returned by 47 assessors.

FINDINGS:
The majority of respondents (89%) were occupational therapists. Assessors reported doing an average of eight FTD assessments per month (range = 1 to 40) at an average cost of $366 (SD = $225; range = $40 to $985). Referrals came from physicians (96%), other health professionals (70%), and licensing authorities (66%). Clients with stroke, dementia, traumatic brain injury, mild cognitive impairment, and multiple sclerosis composed 62% of estimated caseloads. Assessments took 3 hr on average (range = 1.24 to 4.5 hr); 64% reported they always took clients on road regardless of clinic results.

IMPLICATIONS:
Evidence-based guidelines for training and assessment are clearly needed given the inconsistency in practice.

PMID: 24640644  [PubMed - indexed for MEDLINE]

[Mild dementia and driving ability. Part 1: Fundamentals]. [Article in German]
Wolter DK(1).

Physiological changes, but most of all diseases, affect driving ability in old age, whereby cognitive and mental performance plays an important part. Impaired health and feeling of unease while driving are the main reasons for driving cessation in the elderly. The causes of crashes and crash development show typical features compared to younger drivers. In the assessment of accident frequency and crash risk, sophisticated analyses are necessary. A person with moderate to severe dementia is certainly no longer fit to drive, whereas driving ability may be maintained in mild dementia for some time. In part 2, comprehensive information on the practice of assessment and judgement of driving ability is provided.

PMID: 24633627  [PubMed - indexed for MEDLINE]

Epilepsy in adults.
BACKGROUND:
Epilepsy is a common disorder and most adult patients will be managed primarily by general practitioners. Despite new developments in the classification and treatment of epilepsy, basic principles of diagnosis and treatment remain valid, such as the importance of an accurate, detailed history and adjusting antiepileptic drug (AED) doses on the basis of seizure control and adverse effects rather than blood test results.

OBJECTIVE:
This article addresses current issues in the diagnosis and management of epilepsy, including initial evaluation and use of AEDs.

DISCUSSION:
Older AEDs are still prescribed commonly; newer AEDs have similar efficacy and improved tolerability. Human leukocyte-associated antigen (HLA) testing is recommended before commencing Asian patients on carbamazepine to minimise the risk of Stevens-Johnson syndrome (SJS). Referral to an epilepsy specialist is recommended if seizures are not controlled after trialling two AEDs. Important issues pertaining to reproductive and bone health are complex and poorly understood.

PMID: 24600669 [PubMed - indexed for MEDLINE]

Predicting road test performance in drivers with stroke.
Barco PP(1), Wallendorf MJ(2), Snellgrove CA(3), Ott BR(4), Carr DB(5).

OBJECTIVE:
The aim of this study was to develop a brief screening battery to predict the on-road performance of drivers who had experienced a stroke.

METHOD:
We examined 72 people with stroke referred by community physicians to an academic rehabilitation center. The outcome variable was pass or fail on the modified Washington University Road Test. Predictor measures were tests of visual, motor, and cognitive functioning. RESULTS. The best predictive model for failure on the road test included Trail Making Test Part A and the Snellgrove Maze Task®.

CONCLUSION:
A screening battery that can be performed in less than 5 min was able to assist in the prediction of road test performance in a sample of drivers with stroke. A probability of failure calculator may be useful for clinicians in their decision to refer clients with stroke for a comprehensive driving evaluation.

PMCID: PMC4012570 PMID: 24581409 [PubMed - indexed for MEDLINE]

Managing driving issues after an acquired brain injury: strategies used by health professionals.
Liddle J(1), Hayes R, Gustafsson L, Fleming J.
BACKGROUND/AIM:
The ability to drive safely can be affected by an acquired brain injury. Following acquired brain injury, clients may experience driving disruptions, formal assessment, return to driving or permanent cessation. Health professionals may be involved in formal driving or component skills' assessment and rehabilitation, or interventions for continued community participation. Meeting the needs of clients related to driving remains a challenging area of clinical practice. The aim of this study was to investigate how driving issues are currently managed by acquired brain injury rehabilitation teams.

METHOD:
This study utilised a qualitative phenomenological approach to gain insight into the approaches undertaken by four rehabilitation teams working with clients post-acquired brain injury. Semi-structured, audiotaped interviews were conducted with 25 participants who had identified driving as part of their role.

RESULTS:
Health professional participants described three major areas of clinical focus, describing strategies and challenges associated with each. These were as follows: 'Integrating driving goals into rehabilitation' which involved optimising timing and acknowledging the clients' focus on driving while enhancing driving and rehabilitation outcomes; 'Managing emotional responses' which required protecting therapeutic relationships and providing information, as well as responding to more extreme responses; and finally 'Managing unlicensed driving and meeting long-term needs', which participants identified as the most challenging aspect. Strategies involved using set procedures, building on knowledge of the client, supporting the family and exploring alternatives.

CONCLUSION:
The teams described a range of strategies used to address the challenges related to driving and driving cessation which can be applied to successfully manage this issue in acquired brain injury rehabilitation.

PMID: 24576313 [PubMed - indexed for MEDLINE]


BACKGROUND:
Interventions to improve driving ability after stroke, including driving simulation and retraining visual skills, have limited evaluation of their effectiveness to guide policy and practice.

OBJECTIVES:
To determine whether any intervention, with the specific aim of maximising driving skills, improves the driving performance of people after stroke.

SEARCH METHODS:
We searched the Cochrane Stroke Group Trials register (August 2013), the Cochrane Central Register of Controlled Trials (The Cochrane Library 2012, Issue 3), MEDLINE (1950 to October 2013), EMBASE (1980 to October 2013), and six additional databases. To identify further published, unpublished and ongoing trials, we handsearched relevant journals and conference proceedings, searched trials and research registers, checked reference lists and contacted key researchers in the area.
SELECTION CRITERIA:
Randomised controlled trials (RCTs), quasi-randomised trials and cluster studies of rehabilitation interventions, with the specific aim of maximising driving skills or with an outcome of assessing driving skills in adults after stroke. The primary outcome of interest was the performance in an on-road assessment after training. SECONDARY OUTCOMES included assessments of vision, cognition and driving behaviour.

DATA COLLECTION AND ANALYSIS:
Two review authors independently selected trials based on pre-defined inclusion criteria, extracted the data and assessed risk of bias. A third review author moderated disagreements as required. The review authors contacted all investigators to obtain missing information.

MAIN RESULTS:
We included four trials involving 245 participants in the review. Study sample sizes were generally small, and interventions, controls and outcome measures varied, and thus it was inappropriate to pool studies. Included studies were at a low risk of bias for the majority of domains, with a high/unclear risk of bias identified in the areas of: performance (participants not blinded to allocation), and attrition (incomplete outcome data due to withdrawal) bias. Intervention approaches included the contextual approach of driving simulation and underlying skill development approach, including the retraining of speed of visual processing and visual motor skills. The studies were conducted with people who were relatively young and the timing after stroke was varied.

PRIMARY OUTCOME:
there was no clear evidence of improved on-road scores immediately after training in any of the four studies, or at six months (mean difference 15 points on the Test Ride for Investigating Practical Fitness to Drive - Belgian version, 95% confidence intervals (CI) 4.56 to 34.56, P value = 0.15, one study, 83 participants).

SECONDARY OUTCOMES:
road sign recognition was better in people who underwent training compared with control (mean difference 1.69 points on the Road Sign Recognition Task of the Stroke Driver Screening Assessment, 95% CI 0.51 to 2.87, P value = 0.007, one study, 73 participants). Significant findings were in favour of a simulator-based driving rehabilitation programme (based on one study with 73 participants) but these results should be interpreted with caution as they were based on a single study. Adverse effects were not reported. There was insufficient evidence to draw conclusions on the effects on vision, other measures of cognition, motor and functional activities, and driving behavior with the intervention.

AUTHORS’ CONCLUSIONS:
There was insufficient evidence to reach conclusions about the use of rehabilitation to improve on-road driving skills after stroke. We found limited evidence that the use of a driving simulator may be beneficial in improving visuocognitive abilities, such as road sign recognition that are related to driving. Moreover, we were unable to find any RCTs that evaluated on-road driving lessons as an intervention. At present, it is unclear which impairments that influence driving ability after stroke are amenable to rehabilitation, and whether the contextual or remedial approaches, or a combination of both, are more efficacious.

PMID: 24567028 [PubMed - indexed for MEDLINE]

Driving among patients with epilepsy in West China.
Chen J(1), Yan B(1), Lu H(2), Ren J(1), Zou X(1), Xiao F(1), Hong Z(1), Zhou D(3).
PURPOSE:
This study was conducted to survey the driving status of PWE in West China and to explore the sociodemographic and clinical factors associated with driving.

METHODS:
Between October 2012 and October 2013, all adult patients who came to our epilepsy clinic in the West China Hospital were invited to participate. Logistic regression was used to detect the patient factors associated with driving.

RESULTS:
A total of 657 patients completed this study. We found that 128 (19.5%) of these patients had driven recently (during the past year); among them, 80 (62.5%) experienced at least one seizure in the previous year. A logistic regression suggested that age, being male, being married, having a higher personal income, experiencing no seizure while awake, and taking fewer antiepileptic drugs were independently associated with recent driving.

CONCLUSION:
This study showed that a considerable proportion of patients continue driving despite uncontrolled seizures. More detailed and operational driving restrictions may be needed for patients in China in order to strike a better balance between patients' quality of life and public safety.

PMID: 24561651  [PubMed - indexed for MEDLINE]


PURPOSE:
It is acknowledged in the literature that the physical and cognitive effects of the degenerative neurological condition of multiple sclerosis can impact upon driver safety. The aim of this study was to identify the experiences and needs of people with multiple sclerosis in relation to driver assessment and rehabilitation.

METHODS:
Focus group discussions were conducted with people with multiple sclerosis (MS) who were: currently driving; no longer licensed or no longer driving and health professionals.

RESULTS:
The four themes that emerged from the data were: (1) from self-management to formal assessment - a journey of uncertainty and emotional dilemmas; (2) lost independence with grieving and adjustment by self and family; (3) alternative transport is challenging and unsatisfactory; (4) gaps in information and services exist.

CONCLUSIONS:
The results of this study highlight the need for ongoing support in relation to driving for people with MS, ranging from support for self-management, driving assessment and retraining, and preparation for loss of license. Standardised information needs to be developed and health professionals and licensing authorities require knowledge and skills to ensure driver assessment and rehabilitation processes and resources can better meet the needs of people with MS.
IMPLICATIONS FOR REHABILITATION:
There is a need for health professionals to examine driving in people with MS in a holistic manner taking into account the context for the person and the supports available. Self-management and self-assessment emerged as a preferred approach for the participants in this study, indicating that health professionals may need to engage with the process. Tools to support self-assessment of driving abilities for people with MS require further research. Indicators for review and formal assessment of driving abilities is needed. Alternative forms of transport require further investigation and improvement for people with MS.

PMID: 24555685 [PubMed - indexed for MEDLINE]


PURPOSE:
The ability of visually impaired people to deploy attention effectively to maximize use of their residual vision in dynamic situations is fundamental to safe mobility. We conducted a pilot study to evaluate whether tests of dynamic attention (multiple object tracking; MOT) and static attention (Useful Field of View; UFOV) were predictive of the ability of people with central field loss (CFL) to detect pedestrian hazards in simulated driving.

METHODS:
11 people with bilateral CFL (visual acuity 20/30-20/200) and 11 age-similar normally-sighted drivers participated. Dynamic and static attention were evaluated with brief, computer-based MOT and UFOV tasks, respectively. Dependent variables were the log speed threshold for 60% correct identification of targets (MOT) and the increase in the presentation duration for 75% correct identification of a central target when a concurrent peripheral task was added (UFOV divided and selective attention subtests). Participants drove in a simulator and pressed the horn whenever they detected pedestrians that walked or ran toward the road. The dependent variable was the proportion of timely reactions (could have stopped in time to avoid a collision).

RESULTS:
UFOV and MOT performance of CFL participants was poorer than that of controls, and the proportion of timely reactions was also lower (worse) (84% and 97%, respectively; p=0.001). For CFL participants, higher proportions of timely reactions correlated significantly with higher (better) MOT speed thresholds (r=0.73, p=0.01), with better performance on the UFOV divided and selective attention subtests (r=-0.66 and -0.62, respectively, p<0.04), with better contrast sensitivity scores (r=0.54, p=0.08) and smaller scotomas (r=-0.60, p=0.05).

CONCLUSIONS:
Our results suggest that brief laboratory-based tests of visual attention may provide useful measures of functional visual ability of individuals with CFL relevant to more complex mobility tasks.

PMCID: PMC3928437 PMID: 24558495 [PubMed - indexed for MEDLINE]


25
Post-chiasmal visual pathway lesions and glaucomatous optic neuropathy cause binocular visual field defects (VFDs) that may critically interfere with quality of life and driving licensure. The aims of this study were (i) to assess the on-road driving performance of patients suffering from binocular visual field loss using a dual-brake vehicle, and (ii) to investigate the related compensatory mechanisms. A driving instructor, blinded to the participants' diagnosis, rated the driving performance (passed/failed) of ten patients with homonymous visual field defects (HP), including four patients with right (HR) and six patients with left homonymous visual field defects (HL), ten glaucoma patients (GP), and twenty age and gender-related ophthalmologically healthy control subjects (C) during a 40-minute driving task on a pre-specified public on-road parcours. In order to investigate the subjects' visual exploration ability, eye movements were recorded by means of a mobile eye tracker. Two additional cameras were used to monitor the driving scene and record head and shoulder movements. Thus this study is novel as a quantitative assessment of eye movements and an additional evaluation of head and shoulder was performed. Six out of ten HP and four out of ten GP were rated as fit to drive by the driving instructor, despite their binocular visual field loss. Three out of 20 control subjects failed the on-road assessment. The extent of the visual field defect was of minor importance with regard to the driving performance. The site of the homonymous visual field defect (HVFD) critically interfered with the driving ability: all failed HP subjects suffered from left homonymous visual field loss (HL) due to right hemispheric lesions. Patients who failed the driving assessment had mainly difficulties with lane keeping and gap judgment ability. Patients who passed the test displayed different exploration patterns than those who failed. Patients who passed focused longer on the central area of the visual field than patients who failed the test. In addition, patients who passed the test performed more glances towards the area of their visual field defect. In conclusion, our findings support the hypothesis that the extent of visual field per se cannot predict driving fitness, because some patients with HVFDs and advanced glaucoma can compensate for their deficit by effective visual scanning. Head movements appeared to be superior to eye and shoulder movements in predicting the outcome of the driving test under the present study scenario.

PMCID: PMC3921141 PMID: 24523869 [PubMed - indexed for MEDLINE]
Cardiovascular disorders


Long-distance truck drivers have been found to be associated with many medical problems because of their lifestyle and work environment. Many studies have revealed an increased risk in sexually transmitted infections, musculoskeletal disease, sleep disorders, hypertension, gastrointestinal disease, substance abuse and alcoholism, lung cancer, as well as human immunodeficiency virus infection. To our knowledge, there are no any articles about a fatal case of pulmonary thromboembolism. We report a case of a 45-year-old truck driver, who was found dead in his truck at a service station along the A1 motorway in Umbria, Italy. Autopsy findings revealed pulmonary thromboembolism as cause of death. Our report underlies that future actions must be addressed to provide health care access to this vulnerable, medically underserved population.

PMID: 25310374 [PubMed - indexed for MEDLINE]


OBJECTIVE:
To examine racial differences in poststroke rehabilitation utilization and functional outcomes.

DESIGN:
Observational follow-up study.

SETTING:
Designated stroke center.

PARTICIPANTS:
Stroke survivors (N=162; 106 whites and 56 blacks) surveyed at 1 year poststroke.

INTERVENTION:
Not applicable.

MAIN OUTCOME MEASURES:
Twenty-question measure of activities of daily living (ADL) and instrumental activities of daily living (IADL) performance, life participation, and driving. One-year follow-up data collected from stroke survivors as part of the Stroke Education and Prevention-South Carolina Project were examined for racial disparities in rehabilitation utilization and functional outcomes.

RESULTS:
Analyses revealed no significant differences between blacks and whites for rehabilitation utilization. In multivariate comparisons controlling for stroke severity, blacks were less likely to report independence in overall functional performance and domain-specific measures of toileting, walking, transportation, laundry, and shopping. Blacks also reported less independence in driving at 1-year follow-up.
CONCLUSIONS:
Blacks were less likely to report independence in performing ADL and IADL at 1 year poststroke after controlling for stroke severity. Racial disparities were reported in ADL and IADL performance despite a lack of racial differences in rehabilitation utilization. Future studies are needed to further understand the reason for this disparity in reported functional independence.

PMID: 25223490  [PubMed - indexed for MEDLINE]

Syncope: risk stratification and clinical decision making.
Peeters SY, Hoek AE, Mollink SM, Huff JS.

Syncope is a common occurrence in the emergency department, accounting for approximately 1% to 3% of presentations. Syncope is best defined as a brief loss of consciousness and postural tone followed by spontaneous and complete recovery. The spectrum of etiologies ranges from benign to life threatening, and a structured approach to evaluating these patients is key to providing care that is thorough, yet cost-effective. This issue reviews the most relevant evidence for managing and risk stratifying the syncope patient, beginning with a focused history, physical examination, electrocardiogram, and tailored diagnostic testing. Several risk stratification decision rules are compared for performance in various scenarios, including how age and associated comorbidities may predict short-term and long-term adverse events. An algorithm for structured, evidence-based care of the syncope patient is included to ensure that patients requiring hospitalization are managed appropriately and those with benign causes are discharged safely.

PMID: 25105200  [PubMed - indexed for MEDLINE]

Appropriate duration of driving restrictions after inappropriate therapy from implantable cardiac shock devices-interim analysis of the Nippon Storm Study.

BACKGROUND:
Little is known regarding the appropriate duration for driving restrictions after inappropriate implantable cardiac shock device (ICSD) therapy.

METHODS AND RESULTS:
We evaluated the Nippon Storm Study data, and found that inappropriate ICSD therapy occurred in 114 (7.6%) patients during a median follow-up of 464 days. Among those patients, 25 experienced further inappropriate ICSD therapy during a subsequent median follow-up of 380 days. Time-dependent recurrence of inappropriate ICSD therapy occurred in 19 (76%) patients within 180 days.

CONCLUSIONS:
The interval for driving restrictions after inappropriate ICSD therapy can be reduced.

PMID: 25030300  [PubMed - indexed for MEDLINE]
Diabetes Mellitus

The influence of new European Union driver's license legislation on reporting of severe hypoglycemia by patients with type 1 diabetes.
Pedersen-Bjergaard U(1), Færch L(2), Allingbjerg ML(2), Agesen R(3), Thorsteinsson B(3).

OBJECTIVE:
We test the hypotheses that the implementation in Denmark of new, stricter European Union (EU) legislation on driver's licensing, with the purpose to improve traffic safety in January 2012, has reduced the self-reported rate of severe hypoglycemia in a routine clinical setting and that anonymous reporting results in higher event rates.

RESEARCH DESIGN AND METHODS:
A cohort of 309 patients with type 1 diabetes was recruited in the outpatient clinic at Nordsjællands University Hospital Hillerød, Denmark. Yearly numbers of severe hypoglycemic events defined by need for treatment assistance from another person were retrieved from medical records in the years 2010 to 2012 and retrospectively reported in an anonymous questionnaire. Data from medical records in 2012 were compared with those from 2010 and 2011 and with data from the questionnaire.

RESULTS:
Reported rates of severe hypoglycemia in the medical records were reduced by 55% in 2012 compared with the prior years (P = 0.034). The proportion of subjects reporting recurrent episodes was grossly reduced from 5.6 to 1.5% (P = 0.014). Compared with anonymous reporting in the questionnaire, the rate of severe hypoglycemia in 2012 was 70% lower (P < 0.001).

CONCLUSIONS:
Reporting of severe hypoglycemia by patients with type 1 diabetes is significantly reduced following implementation of EU driver's licensing legislation that implies withdrawal of driver's licensing in case of recurrent episodes within 1 year. The resulting burden of concealed severe hypoglycemia may impair the safety of affected patients and unintentionally paradoxically reduce the general traffic safety.

PMID: 25288675 [PubMed - indexed for MEDLINE]
**Psychiatric disorders**

Attention deficit hyperactivity disorder, other mental health problems, substance use, and driving:
examination of a population-based, representative Canadian sample.
Vingilis E(1), Mann RE, Erickson P, Toplak M, Kolla NJ, Seeley J, Jain U.

PURPOSE:
The purpose of this study is to examine the relationships among self-reported screening measures of
attention deficit hyperactivity disorder (ADHD), other psychiatric problems, and driving-related
outcomes in a provincially representative sample of adults 18 years and older living in the
province of Ontario, Canada.

METHODS:
The study examined the results of the Centre for Addictions and Mental Health (CAMH) Ontario
Monitor, an ongoing repeated cross-sectional telephone survey of Ontario adults over a 2-year
period. Measures included ADHD measures (Adult ADHD Self-Report Scale-V1.1 [ASRS-V1.1],
previous ADHD diagnosis, ADHD medication use); psychiatric distress measures (General Health
Questionnaire [GHQ12], use of pain, anxiety, and depression medication); antisocial behavior
measure (The Antisocial Personality Disorder Scale from the Mini-International Neuropsychiatric
Interview [APD]); substance use and abuse measures (alcohol, cannabis, and cocaine), Alcohol Use
Disorders Identification Test (AUDIT), Alcohol, Smoking and Substance Involvement Screening Test
(ASSIST), driving-related outcomes (driving after drinking, driving after cannabis use,
street racing, collisions in past year), and sociodemographics (gender, age, vehicle-kilometers
traveled).

RESULTS:
A total of 4,014 Ontario residents were sampled, of which 3,485 reported having a valid driver’s
license. Overall, 3.22% screened positive for ADHD symptoms on the ASRS-V1.1 screening tool. A
greater percentage of those who screened positive were younger, reported previous ADHD diagnosis
and medication use, distress, antisocial behavior, anti-anxiety and antidepressant medication
use, substance use, and social problems compared to those who screened negative. However, there
were no statistically significant differences between those who screened positive or negative for
ADHD symptoms on self-reported driving after having 2 or more drinks in the previous hour; within
an hour of using cannabis, marijuana, or hash; or in a street race or collision involvement as a driver
in the past year. When a sequential regression was conducted to predict self-reported collisions,
younger age and higher weekly kilometers driven showed higher odds of collision involvement, and
the odds ratio for cannabis use ever approached statistical significance.

DISCUSSION:
This study is the first population-based study of a representative sample of adults 18 years and older
living in Ontario, Canada. These results showed no relationship between the ADHD screen and
collision when age, sex, and kilometers driven are controlled for. However, these analyses are based
on self-report screeners and not psychiatric diagnoses and a limited sample of ADHD respondents.
Thus, these results should be interpreted with caution.

PMID: 25307372 [PubMed - indexed for MEDLINE]

Cognitive complaints of adults with attention deficit hyperactivity disorder.
Fuermaier AB(1), Tucha L, Koerts J, Aschenbrenner S, Weisbrod M, Lange KW, Tucha O.
Executive dysfunction of adults with ADHD is often associated with poor self-awareness of problems, such as in emotional competence, emotional recognition, and driving competence. However, with regard to cognitive functioning, little is known about how adults with ADHD evaluate their own cognitive performance. A total of 77 adults with ADHD and 116 healthy adults were assessed with self-report scales measuring several aspects of cognition. Significance and effect sizes as well as the proportion of patients perceiving impairments were calculated. Further analysis was carried out on the frequency of patients perceiving various types of impairments. Adults with ADHD perceived themselves to have significant and severe dysfunction in all areas of cognition assessed as a group. Furthermore, the majority of patients reported multiple impairments in attention, memory and executive functioning. The present study demonstrated that adults with ADHD are aware of problems in cognitive functioning as shown by considerable perceived neuropsychological impairment in the majority of patients. Patients with ADHD tended to report cognitive impairments in multiple domains rather than impairments in specific functions.

PMID: 25270667  [PubMed - indexed for MEDLINE]


OBJECTIVE:
To examine the extent to which effortful control (EC) and sensation seeking (SS) tendencies explain the association between the severity of ADHD symptoms and risky behaviors.

METHOD:
Participants included 555 college students (66% females) who completed self-report measures assessing their ADHD symptoms, EC abilities, SS tendencies, and risky health (e.g., substance use) and driving/financial behaviors (e.g., misuse of credit cards).

RESULTS:
Severity of college students' ADHD symptoms, EC abilities, and SS tendencies were related to all risky behaviors. Multiple mediational analyses further indicated that students' SS tendencies significantly mediated the association between ADHD symptoms and the risky health factor but not the risky driving/financial factor. EC, however, significantly mediated the association between ADHD symptoms and both the risky health and driving/financial factors.

CONCLUSION:
The current study provides initial data showing potentially different mechanisms that explain the link between college students' severity of ADHD symptoms and risky behaviors.

PMID: 24743978  [PubMed - indexed for MEDLINE]


BACKGROUND:
Motor vehicle crashes are leading causes of death among teens. Those teens with attention deficit/hyperactivity disorder (ADHD), autism spectrum disorder (ASD), or a dual diagnosis of ADHD/ASD have defining characteristics placing them at a greater risk for crashes.
PURPOSE:
This study examined the between-group demographic, clinical, and simulated driving differences in teens, representing three diagnostic groups, compared to healthy controls (HCs).

METHOD:
In this prospective observational study, we used a convenience sample of teens recruited from a variety of community settings.

FINDINGS:
Compared to the 22 HCs (mean age = 14.32, SD = +/- 0.72), teen drivers representing the diagnostic groups (ADHD/ASD, n = 6, mean age = 15.00, SD = +/- 0.63; ADHD, n = 9, mean age = 15.00, SD = +/- 1.00; ASD, n = 7, mean age = 15.14, SD = +/- 1.22) performed poorer on visual function, visual-motor integration, cognition, and motor performance and made more errors on the driving simulator.

IMPLICATIONS:
Teens from diagnostic groups have more deficits driving on a driving simulator and may require a comprehensive driving evaluation.

PMID: 24640642 [PubMed - indexed for MEDLINE]

Adolescents with ADHD demonstrate driving inconsistency.

PMID: 24560322 [PubMed - indexed for MEDLINE]

Parenting behaviors during risky driving by teens with attention-deficit/hyperactivity disorder.
Schatz NK(1), Fabiano GA(2), Morris KL(2), Shucard JM(2), Leo BA(3), Bieniek C(3).

Parenting practices for teen drivers with ADHD were observed via a video monitor installed in vehicles. All teens had recently completed a driver education course and were in the driving permit stage of a graduated driver-licensing program. Parent behaviors were coded during drives when teens were driving safely and during drives when teens engaged in risky driving. The overall frequency of positive parenting strategies was low, regardless of whether teens drove safely or engaged in risky driving. Although the rate of negative feedback was also low, parents engaged in significantly more criticism and were rated by an observer to appear angrier when teens were driving in a risky manner. No other differences in parent behaviors associated with the quality of teen driving were observed. The inconsistencies between observed parenting behaviors and those parenting practices recommended as effective with teens with ADHD are discussed. The need for further research addressing effective strategies for teaching teens with ADHD to drive is highlighted.

PMID: 24491192 [PubMed - indexed for MEDLINE]

ADHD and relative risk of accidents in road traffic: a meta-analysis. Vaa T(1).
The present meta-analysis is based on 16 studies comprising 32 results. These studies provide sufficient data to estimate relative accident risks of drivers with ADHD. The overall estimate of relative risk for drivers with ADHD is 1.36 (95% CI: 1.18; 1.57) without control for exposure, 1.29 (1.12; 1.49) when correcting for publication bias, and 1.23 (1.04; 1.46) when controlling for exposure. A relative risk (RR) of 1.23 is exactly the same as found for drivers with cardiovascular diseases. The long-lasting assertion that "ADHD-drivers have an almost fourfold risk of accident compared to non-ADHD-drivers", which originated from Barkley et al.'s study of 1993, is rebutted. That estimate was associated with comorbid Oppositional Defiant Disorder (ODD) and/or Conduct Disorder (CD), not with ADHD, but the assertion has incorrectly been maintained for two decades. The present study provides some support for the hypothesis that the relative accident risk of ADHD-drivers with comorbid ODD, CD and/or other conduct problems, is higher than that of ADHD-drivers without these comorbidities. The estimated RRs were 1.86 (1.27; 2.75) in a sample of ADHD-drivers in which a majority had comorbid ODD and/or CD compared to 1.31 (0.96; 1.81) in a sample of ADHD-drivers with no comorbidity. Given that ADHD-drivers most often seem to drive more than controls, and the fact that a majority of the present studies lack information about exposure, it seems more probable that the true RR is lower rather than higher than 1.23. Also the assertion that ADHD-drivers violate traffic laws more often than other drivers should be modified: ADHD-drivers do have more speeding violations, but no more drunk or reckless driving citations than drivers without ADHD. All accident studies included in the meta-analysis fail to acknowledge the distinction between deliberate violations and driving errors. The former are known to be associated with accidents, the latter are not. A hypothesis that ADHD-drivers speed more frequently than controls because it stimulates attention and reaction time is suggested.

PMID: 24238842 [PubMed - indexed for MEDLINE]

Fitness to drive in cognitive impairment--a quantitative study of GPs' experience. Doherty U, Hawke AL, Kearns J, Kelly M.

Assessing fitness to drive is part of the role of general practitioners. Cognitive impairment may affect an individual's ability to drive safely. The aims of our study were to question GPs about their experience of assessing patients with cognitive impairment for driving fitness and to explore their attitudes to this role. We carried out a quantitative cross-sectional anonymous postal survey of 200 GPs in counties Galway, Mayo and Roscommon. Ethical approval was obtained from the Irish College of General Practitioners. Data was analysed using Epi Info. The response rate was 62.5% (n=125). 86 (68.8%) GPs used guidelines when assessing fitness to drive in cognitive impairment. 83 (66.4%) respondents formally assess cognitive function. 52 (41.6%) GPs would certify someone as fit to drive with verbal restrictions. 102 (81.6%) respondents feel confident in assessing fitness to drive. 98 (78.4%) GPs have referred patients for further assessment.

PMID: 26016301 [PubMed - indexed for MEDLINE]

Drivers with dementia in Japan: required public support under strict legal restrictions. Mizuno Y(1), Arai Y.

PMID: 25800919 [PubMed - indexed for MEDLINE]

[Automobile driving capacity in dementia]. [Article in German; Abstract available in German from the publisher] Seeger R(1).
Dementia influences at an early stage the driving aptitude of motor vehicle steering persons. Every year in Switzerland, around 16,000 driving permit holders suffer newly from dementia; therefore the driving aptitude is questioned, especially because of possibly limited executive functions. Individuals with early-stage dementia often may show a dangerous driving style. However, a mild dementia does not a priori exclude the driving aptitude, and less than half of these drivers can continue driving for another 1 - 3 years. In contrast, there is no further driving aptitude in presence of moderate dementia. In the assessment of driving aptitude, the underlying cause of dementia is always taken into account. Cognitive short tests such as the Mini-Mental Status Exam, Clock Drawing Test and Trail-Making Test are not suitable to make reliable statements about the aptitude to drive, but these tests are very important for the initial diagnosis of dementia in primary care practice and can lead the way for further examination concerning driving aptitude. The legally prescribed regular check-up for motorists aged over 70 years in Switzerland provides an ideal opportunity for early detection of incipient dementia. The practical procedure for the assessment of aptitude to drive in the primary care practice is presented. The physician-guided on-road driving test represents a meaningful, practical and relatively cost-effective tool for the evaluation of driving aptitude in cases of doubt.

Publisher: Abstract available from the publisher. PMID: 25791047 [PubMed - indexed for MEDLINE]

We can predict when driving is no longer safe for people who have HD using standard neuropsychological measures.
Hennig BL(1), Kaplan RF(1), Nowicki AE(1), Barclay JE(1), Gertsberg AG(1).

BACKGROUND:
Early cognitive dysfunction in Huntington's Disease (HD) is typically of a subcortical frontal executive type, with bradyphrenia, poor spatial and working memory, poor planning and organization, a lack of judgment, and poor mental flexibility. Although there is literature suggesting a correlation between deficits in speed of processing, working memory and executive function on driving competency, there is little direct evidence comparing these declines on tests to actual driving skills.

OBJECTIVE:
The current study examines the utility of specific neuropsychological measures in predicting actual driving competency in patients with HD.

METHODS:
Fifty-two patients at the UConn Health HD Program underwent yearly neuropsychological evaluations and were included in this study. Four scales were chosen a priori to predict driving impairment because of their reported relationship to driving ability. Within each test category, subjects who scored below the threshold suggestive of neurological impairment were found to have results within the impaired range (1.5 standard deviations below corrective normative data). A referral to the Connecticut Department of Motor Vehicles (DMV) for a driving evaluation was subsequently made on patients who were found impaired on any two of these tests.

RESULTS:
The authors found a strong relationship between scores on a simple battery of four neuropsychological tests and driving competency.

CONCLUSIONS:
This short battery may prove of pragmatic value for clinicians working with people with HD and their families.

PMID: 25575956 [PubMed - indexed for MEDLINE]
The neural correlates of road sign knowledge and route learning in semantic dementia and Alzheimer's disease.

BACKGROUND:
Although there is a growing body of research on driving and Alzheimer's disease (AD), focal dementias have been understudied. Moreover, driving has never been explored in semantic dementia (SD).

METHODS:
An experimental battery exploring road sign knowledge and route learning was applied to patients with SD and AD selected in the early-moderate stage of disease and to a group of healthy participants. Neuropsychological data were correlated to cerebral hypometabolism distribution, investigated by means of positron emission tomography.

RESULTS:
The two dementias showed opposite profiles. Patients with SD showed poor road sign knowledge and normal performance in route learning. By contrast, patients with AD showed low performance in route learning test with preservation of semantic knowledge of road signs. In SD, there was a correlation of semantic knowledge impairment with hypometabolism in the left temporolateral cortex. No correlation between the AD region of interests (ROIs) and the relevant behavioural indices was found, while in the whole-brain analysis there was a significant correlation between route learning and the superior frontal gyrus. DISCUSSION AND CONCLUSIONS: For the first time, driving skills were explored in SD, and it is showed a differential profile from the one detected in AD. We demonstrate that the left anterior temporal cortex is implicated in road sign knowledge, while a distributed cortical network, including the frontal cortex, is likely to process route learning.

PMID: 25535307 [PubMed - indexed for MEDLINE]

Dementia, driving retirement and decision aids.

Driving habits in patients with dementia: a report from Alzheimer's disease assessment units in northern Italy.
Mauri M, Sinforniani E, Cuzzoni MG, Bono G, Zucchella C.

The aim of this study was to characterize the driving behavior of a sample of patients with dementia. Demographic and clinical characteristics and parameters considered to be the most significant predictors of driving ability were collected. Of the total 198 patients enrolled, 172 were still driving. Many subjects (30-65%) were found to have modified their driving habits (reducing driving time and mileage, avoiding driving at night and during rush hours, sticking to familiar routes). The patients' own rating of their driving ability was significantly higher than their caregivers' rating (51% versus 29%). Crash history was not a significant variable. The patients' restriction of their driving increased significantly (p<0.01) with age and increasing worsening of cognitive, functional and behavioral
variables. In the absence of a gold standard for determining fitness to drive, the patients’ driving habits were self-regulated and, in particular, regulated by their caregivers. Age and degree of dementia can be considered among the best predictors of driving safety.

PMCID: PMC4198158 PMID: 25306120 [PubMed - indexed for MEDLINE]


OBJECTIVES:
To examine the association between Mini-Mental State Examination (MMSE) score and motor vehicle crash (MVC) risk in a large cohort of community-dwelling participants with cardiovascular disease (CVD) or diabetes mellitus.

DESIGN:
Prospective observational study.

SETTING:
Participants enrolled in the Ongoing Telmisartan Alone and in Combination With Ramipril Global End Point Trial and Telmisartan Randomized Assessment Study in ACE Intolerant Subjects with Cardiovascular Disease clinical trial, which included individuals aged 55 and older with CVD or diabetes mellitus.

PARTICIPANTS:
Totally 17,538 frequent drivers (defined as driving at least once per week) who had completed a baseline MMSE.

MEASUREMENTS:
Involvement in a MVC as the driver.

RESULTS:
Baseline MMSE score was divided into four categories: 30, 27-29, 24-26, and <24. The median MMSE score was 29 (interquartile range 27-30), and 726 (4.1%) has a MMSE score of less than 24 at baseline. After a mean follow-up of 4.5 years, 1,068 (6.1%) participants were drivers in a MVC. Lower scores were not associated with future MVCs (MMSE score 29-27, hazard ratio (HR)=1.06, 95% confidence interval (CI)=0.93-1.22); MMSE score 26-24, HR=0.96, 95% CI=0.78-1.19; MMSE score<24, HR=0.72, 95% CI=0.50-1.05) on multivariable analysis. A MVC within the previous 2 years (HR=2.68, 95% CI=2.29-3.13) was the strongest predictor of future MVCs. Other clinical factors associated with greater MVC risk were depression, falls within the previous year, sleep apnea, and lower baseline systolic blood pressure.
CONCLUSION:
In a population of frequent drivers, the MMSE does not predict MVCs. Other clinical factors have a stronger association with MVC risk.

PMID: 25040793  [PubMed - indexed for MEDLINE]

Responsible management of motor vehicle drivers with dementia.

When Bridget Driscoll, a 44-year-old mother of two died after being struck by a motor vehicle, considered to be the first motor vehicle fatality in UK and possibly the world, the coroner stated 'I trust this sort of nonsense will never happen again'.1 Sadly, the coroner, medical practitioners and general public would be deeply and repeatedly disappointed. It was 1896. Motor vehicles were a curiosity. Drivers did not undergo any form of testing, be it medical fitness, driving ability or otherwise, and there were no licensing regulatory agencies. By 2010, road injury was the ninth most common cause of death globally (1.3 million deaths per annum) and dementia the fourth most common in high income countries.2 By 2030 the number of all licensed UK drivers who are 65 years or older will increase by almost 50% to almost one in every four drivers.3 If the juxtaposition of driving with dementia in an ageing population is not already a contentious social, political and medical issue, it certainly will become so.

PMID: 24995438  [PubMed - indexed for MEDLINE]

[Dementia and driving]. [Article in German]
Brunnauer A(1), Buschert V, Laux G.

For most people driving is essential for mobility to maintain independence and to take part in activities of daily living. Ageing per se does not impair driving but in cases of medical conditions, such as cognitive impairment and dementia, driving safety can be impaired. Thus clinicians are often called upon to counsel patients and to make recommendations on their fitness to drive. Dementia in the early stages of the illness does not necessarily preclude driving ability. Patients with mild dementia pose a risk with respect to traffic safety and an individual assessment with regular follow up investigations should be made. Especially patients with frontotemporal dementia should cease driving early in the course of the disease. Screening tests that focus on visuospatial abilities, attention and executive functions can improve the prediction of driving ability in patients with dementia. In many cases an on-road driving test to evaluate the ability to compensate for functional impairments is essential. In order to preserve personal autonomy as long as possible patients should be individually counselled taking into account driving experience, insight into functional impairments, personality and the capability to compensate for functional disabilities.

PMID: 24973013  [PubMed - indexed for MEDLINE]

Cognitive impairment and dementia in Parkinson's disease: practical issues and management.
Emre M(1), Ford PJ, Bilgiç B, Uç EY.
Cognitive impairment and dementia pose particular challenges in the management of patients with Parkinson’s disease (PD). Decision-making capacity can render patients vulnerable in a way that requires careful ethical considerations by clinicians with respect to medical decision making, research participation, and public safety. Clinicians should discuss how future decisions will be made as early in the disease course as possible. Because of cognitive, visual, and motor impairments, PD may be associated with unsafe driving, leading to early driving cessation in many. DBS of the STN and, to a lesser degree, globus pallidus interna (GPi) has consistently been associated with decreased verbal fluency, but significant global cognitive decline is usually not observed in patients who undergo rigorous selection. There are some observations suggesting lesser cognitive decline in GPi DBS than STN DBS, but further research is required. Management of PD dementia (PDD) patients involves both pharmacological and nonpharmacological measures. Patients with PDD should be offered treatment with a cholinesterase inhibitor taking into account expected benefits and potential risks. Treatment with neuroleptics may be necessary to treat psychosis; classical neuroleptics, as well as risperidone and olanzapine, should be avoided. Quetiapine might be considered first-line treatment because it does not need special monitoring, although the strongest evidence for efficacy exists for clozapine. Evidence from randomized, controlled studies in the PDD population is lacking; selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors may be used to treat depressive features. Clonazepam or melatonin may be useful in the treatment of rapid eye movement behavior disorder.

PMID: 24757114  [PubMed - indexed for MEDLINE]


Driving is an important aspect of daily living and for many older people provides autonomy and psycho-social benefits. Cognitive impairment has been found to impact driving skills at the level of dementia, however, uncertainty remains around the impact of a diagnosis of the pre-dementia condition mild cognitive impairment. Current official guidelines are unclear, and assessment of fitness to drive can be problematical. This editorial examines current official guidance available to the clinician and problems with existing assessment as well as the current position of research specifically into MCI and driving, and considers future direction for research in this field.

PMID: 24709165  [PubMed - indexed for MEDLINE]


BACKGROUND:
An increasing number of older adults drive automobiles. Given that the prevalence of dementia is rising, it is necessary to address the issue of driving retirement. The purpose of this study is to evaluate how a self-administered decision aid contributed to decision making about driving retirement by individuals living with dementia. The primary outcome measure in this study was decisional conflict. Knowledge, decision, satisfaction with decision, booklet use and booklet acceptability were the secondary outcome measures.
METHODS:
A mixed methods approach was adopted. Drivers with dementia were recruited from an Aged Care clinic and a Primary Care center in NSW, Australia. Telephone surveys were conducted before and after participants read the decision aid.

RESULTS:
Twelve participants were recruited (mean age 75, SD 6.7). The primary outcome measure, decisional conflict, improved following use of the decision aid. Most participants felt that the decision aid: (i) was balanced; (ii) presented information well; and (iii) helped them decide about driving. In addition, mean knowledge scores improved after booklet use.

CONCLUSIONS:
This decision aid shows promise as an acceptable, useful and low-cost tool for drivers with dementia. A self-administered decision aid can be used to assist individuals with dementia decide about driving retirement. A randomized controlled trial is underway to evaluate the effectiveness of the tool.

PMCID: PMC3999924 PMID: 24642051 [PubMed - indexed for MEDLINE]


Physiological changes, but most of all diseases, affect driving ability in old age, whereby cognitive and mental performance plays an important part. Impaired health and feeling of unease while driving are the main reasons for driving cessation in the elderly. The causes of crashes and crash development show typical features compared to younger drivers. In the assessment of accident frequency and crash risk, sophisticated analyses are necessary. A person with moderate to severe dementia is certainly no longer fit to drive, whereas driving ability may be maintained in mild dementia for some time. In part 2, comprehensive information on the practice of assessment and judgement of driving ability is provided.

PMID: 24633627 [PubMed - indexed for MEDLINE]

23. The Secretary of State’s Honorary Medical Advisory Panel on Driving and Psychiatric Disorders. 23rd March 2015, London, UK.

Outcomes:
Group 2 license suspension for bipolar and schizophrenia reduced from 3 years to one year. There was some discussion about reducing it further, but the chair felt it took this length of time to establish a diagnosis of rapid cycling disorder (not sure I agree). The main ‘driver’ for this change is that essentially, the courts are doing this anyway on a severity sliding scale basis, but it was also acknowledged that the philosophy of the DVLA has moved on since these rules were introduced.

Change of the term chronic schizophrenia to relapsing/remitting schizophrenia/psychosis to reflect the course rather than simple duration of illness

Dr. Paul Fearon suggested changing the term acute schizophrenia to brief or transient psychotic disorders but it was felt that acute schizophrenia was a more widely understood term (but this may be something worth visiting at the next review of our guidelines)
There was an interesting discussion about older people with markedly impaired on-road assessments and informal evidence of cognitive decline but no diagnosis as yet (as they had presented clinically with a driving event and hadn’t seen a specialist yet). The DVLA are being increasingly and aggressively challenged in court by such cases and generally, the courts find for the driver, on the basis that there is no clinical diagnosis. The gulf between the DVLA’s priority of functional impairment and the relative weight of a clinical diagnosis given by the courts was noted with some dismay. This is becoming a significant problem for them over the last couple of years and they expect it to worsen.
Drug and alcohol misuse and dependence


OBJECTIVES:
We estimated the injury prevention impact and cost savings associated with alcohol interlock installation in all new US vehicles.

METHODS:
We identified fatal and nonfatal injuries associated with drinking driver vehicle crashes from the Fatality Analysis Reporting System and National Automotive Sampling System's General Estimates System data sets (2006-2010). We derived the estimated impact of universal interlock installation using an estimate of the proportion of alcohol-related crashes that were preventable in vehicles < 1 year-old. We repeated this analysis for each subsequent year, assuming a 15-year implementation. We applied existing crash-induced injury cost metrics to approximate economic savings, and we used a sensitivity analysis to examine results with varying device effectiveness.

RESULTS:
Over 15 years, 85% of crash fatalities (> 59 000) and 84% to 88% of nonfatal injuries (> 1.25 million) attributed to drinking drivers would be prevented, saving an estimated $342 billion in injury-related costs, with the greatest injury and cost benefit realized among recently legal drinking drivers. Cost savings outweighed installation costs after 3 years, with the policy remaining cost effective provided device effectiveness remained above approximately 25%.

CONCLUSIONS:
Alcohol interlock installation in all new vehicles is likely a cost-effective primary prevention policy that will substantially reduce alcohol-involved crash fatalities and injuries, especially among young vulnerable drivers.


PMID: 25698778 [PubMed - indexed for MEDLINE]

PMID: 25698776  [PubMed - indexed for MEDLINE]

5. BMJ. 2014 Dec 23;349:g7745. doi: 10.1136/bmj.g7745. Personal breathalysers may give false reassurance to drivers, research shows. Gornall J(1).

PMID: 25538107  [PubMed - indexed for MEDLINE]


Emergency physicians are confronted daily with the care of traumatically injured patients. A considerable proportion of blunt trauma cases are due to motor vehicle crashes. While men have historically been overrepresented in crash-related injuries and deaths, unfavorable trends for women in alcohol-impaired driving crashes have emerged. This extended commentary with in-depth review presents an examination of the evolving role of sex and gender in alcohol-impaired driving and its outcomes.

PMID: 25491711  [PubMed - indexed for MEDLINE]


PMID: 25475125  [PubMed - indexed for MEDLINE]


PMID: 25475076  [PubMed - indexed for MEDLINE]

Curreen M(1), Lidmila J(2).
OBJECTIVE:
To examine the research on the dependence and abuse potential of zopiclone and the concerns that may be raised for addiction treatment services and General Practice. The focus is on four main areas: Problems that may arise from recommended use; Driving; Issues relating to dependence, and Abuse or recreational misuse.

METHOD:
Internet-based searches were carried out using the key descriptors of zopiclone and driving, road traffic accidents, dependence, withdrawal, abuse, misuse and overdose.

RESULTS:
Problems arising from recommended use are rare and almost always confined to common side-effects. Driving-related studies indicate the potential for driving impairment for up to 12 hours following use and this has clear implications for both addiction services and general practice. The likelihood of dependence increases once recommended doses and time-frames are exceeded and vulnerable populations such as psychiatric patients and those with addiction problems are at risk.

CONCLUSION:
Somewhat contrary to impressions that Zopiclone has little or no abuse potential, there is evidence that this medication is prescribed at higher than recommended doses and for longer than recommended. It can also be obtained readily other than by prescription. The potential for deliberate abuse may now be regarded as established, albeit at low levels compared to the benzodiazepines and this requires a degree of vigilance by prescribers and care managers.

PMID: 25420760 [PubMed - indexed for MEDLINE]

Re: "trends in alcohol and other drugs detected in fatally injured drivers in the United States, 1999-2010".


Suspected impaired driving case involving α-pyrrolidinovalerophenone, methylone and ethylone.
Knoy JL(1), Peterson BL(2), Couper FJ(2).

This is the first reported case of α-pyrrolidinovalerophenone (α-PVP), methylone and ethylone in a suspected impaired driving case in the state of Washington. An initial traffic stop by law enforcement was made of a driver due to poor navigation of the roadway. The drug recognition expert (DRE) officer observed slurred speech, bloodshot watery eyes, dilated pupils, involuntary muscle movements and an elevated pulse and blood pressure. The DRE deduced that the driver was likely under the influence of central nervous system (CNS) stimulants, specifically 'bath salts'. Routine testing of the blood did not reveal the presence of alcohol or common drugs of abuse. Upon further review of the officer's report and the unconfirmed identification of α-PVP, blood was sent to NMS Labs in Willow Grove, PA, USA for bath salts and stimulant designer drugs testing. Analysis was conducted by liquid chromatography-time-of-flight mass spectrometry with the following results: 63 ng/mL α-PVP, 6.1 ng/mL methylone and positive for ethylone. These results are consistent with the DRE opinion of driving performance being impaired by a CNS stimulant.

PMID: 25217556 [PubMed - indexed for MEDLINE]
Vingilis E(1), Mann RE, Erickson P, Toplak M, Kolla NJ, Seeley J, Jain U.

PURPOSE:
The purpose of this study is to examine the relationships among self-reported screening measures of attention deficit hyperactivity disorder (ADHD), other psychiatric problems, and driving-related outcomes in a provincially representative sample of adults 18 years and older living in the province of Ontario, Canada.

METHODS:
The study examined the results of the Centre for Addictions and Mental Health (CAMH) Ontario Monitor, an ongoing repeated cross-sectional telephone survey of Ontario adults over a 2-year period. Measures included ADHD measures (Adult ADHD Self-Report Scale-V1.1 [ASRS-V1.1], previous ADHD diagnosis, ADHD medication use); psychiatric distress measures (General Health Questionnaire [GHQ12], use of pain, anxiety, and depression medication); antisocial behavior measure (The Antisocial Personality Disorder Scale from the Mini-International Neuropsychiatric Interview [APD]); substance use and abuse measures (alcohol, cannabis, and cocaine), Alcohol Use Disorders Identification Test (AUDIT), Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), driving-related outcomes (driving after drinking, driving after cannabis use, street racing, collisions in past year), and sociodemographics (gender, age, vehicle-kilometers traveled).

RESULTS:
A total of 4,014 Ontario residents were sampled, of which 3,485 reported having a valid driver’s license. Overall, 3.22% screened positive for ADHD symptoms on the ASRS-V1.1 screening tool. A greater percentage of those who screened positive were younger, reported previous ADHD diagnosis and medication use, distress, antisocial behavior, anti-anxiety and antidepressant medication use, substance use, and social problems compared to those who screened negative. However, there were no statistically significant differences between those who screened positive or negative for ADHD symptoms on self-reported driving after having 2 or more drinks in the previous hour; within an hour of using cannabis, marijuana, or hash; or in a street race or collision involvement as a driver in the past year. When a sequential regression was conducted to predict self-reported collisions, younger age and higher weekly kilometers driven showed higher odds of collision involvement, and the odds ratio for cannabis use ever approached statistical significance.

DISCUSSION:
This study is the first population-based study of a representative sample of adults 18 years and older living in Ontario, Canada. These results showed no relationship between the ADHD screen and collision when age, sex, and kilometers driven are controlled for. However, these analyses are based on self-report screeners and not psychiatric diagnoses and a limited sample of ADHD respondents. Thus, these results should be interpreted with caution.

PMID: 25307372 [PubMed - indexed for MEDLINE]

Clapp JD(1), Reed MB, Ruderman DE.
BACKGROUND:
Drinking games have become a nearly universal aspect of excessive drinking on university campuses with 50-62% of college students reporting playing drinking games in the past month. Participation in drinking games has been correlated with numerous negative consequences and increased consumption of alcohol.

OBJECTIVES:
The present study addresses the influence of drinking games on three drinking-related outcomes: problems experienced the night of the drinking event, the intent to keep drinking, and the intent to drive after drinking.

METHODS:
The data collected for the present study were part of a study testing environmental influences of drinking behaviors of young adults. A total of 226 randomly selected parties (representing 1725 partygoers) were selected for study inclusion. Three multilevel logistic regression models tested the relationship between drinking games and the three drinking-related outcomes.

RESULTS:
Participants who reported playing drinking games were 1.58 times more likely to report continued drinking intentions than participants who did not play drinking games. If drinking games were observed at a party, participants were 2.38 times more likely to plan to drive while intoxicated. Additionally, participants who reported playing drinking games were 1.59 times more likely to report experiencing a drinking-related problem than participants who did not play drinking games.

CONCLUSION:
Drinking games have consequences beyond increasing the level of intoxication; they contribute to problematic behavior at individual and environmental levels. Preventing drinking games is warranted.

PMID: 25192205 [PubMed - indexed for MEDLINE]


Driving under the influence of alcohol on curved roadway segments has a higher risk than driving on straight segments. To explore the effect of different breath alcohol concentration (BrAC) levels on driving performance in roadway curves, a driving simulation experiment was designed to collect 25 participants' driving performance parameters (i.e., speed and lane position) under the influence of 4 BrAC levels (0.00%, 0.03%, 0.06% and 0.09%) on 6 types of roadway curves (3 radii x 2 turning directions). Driving performance data for 22 participants were collected successfully. Then the average and standard deviation of the two parameters were analyzed, considering the entire curve and different sections of the curve, respectively. The results show that the speed throughout curves is higher when drinking and driving than during sober driving. The significant interaction between alcohol and radius exists in the middle and tangent segments after a curve exit, indicating that a small radius can reduce speed at high BrAC levels. The significant impairment of alcohol on the stability of speed occurs mainly in the curve section between the point of curve (PC) and point of tangent (PT), with no impairment noted in tangent sections. The stability of speed is significantly worsened at higher BrAC levels. Alcohol and radius have interactive effects on the standard deviation of speed in the entry segment of curves, indicating that the small radius amplifies the instability of speed at high BrAC levels. For lateral movement, drivers tend to travel on the right side.
of the lane when drinking and driving, mainly in the approach and middle segments of curves. Higher BrAC levels worsen the stability of lateral movement in every segment of the curve, regardless of its radius and turning direction. The results are expected to provide reference for detecting the drinking and driving state.

PMID: 25146494  [PubMed - indexed for MEDLINE]

Beck KH(1), Kelley-Baker T, Voas RB.

OBJECTIVE:
The purpose of this study was to compare driving under the influence (DUI) offenders on an alcohol ignition interlock program who had or had not changed their primary drinking context from a bar/restaurant where they might be required to drive after drinking before the interlock was installed to drinking at home where driving would not be likely to be required following interlock installation.

METHODS:
A total of 171 DUI offenders who were on an ignition interlock program completed a web-based survey. All of these offenders reported that they drank primarily in a bar/restaurant before the interlock was installed. These offenders were classified into 2 groups: adapters who said they currently drink at home and nonadapters who said they still drink in a bar/restaurant. Measures were made of their reported drinking, driving patterns, perceptions of the likely outcomes of being on the interlock, perceived effectiveness of various prevention strategies, and demographic characteristics. Chi-square and t-test analyses were used to compare these 2 groups.

RESULTS:
Adapters and nonadapters did not differ with regard to any of the demographic characteristics, whether they were a first-time DUI offender, the length of time in the interlock program, number of lockouts (being blocked from starting their cars) they had experienced, miles driven per week, or current driving patterns since being on the interlock program. Adapters were more likely to report changing their drinking plans and habits. Currently they reported fewer drinks per occasion than nonadapters. They were more likely to report reducing the amount they drink, solo drinking or only drinking with a spouse/significant other, and changing their drinking plans and habits. They were also more likely to say that the interlock reminded them to limit their drinking after it is removed and that it might have longer term benefits in preventing future DUls. They were also more receptive to interventions that might help them separate their drinking from their driving.

CONCLUSIONS:
Interlock clients who report that they have altered their drinking context and a willingness to receive programs that help them separate their drinking from their driving may be more receptive to and benefit from ignition interlock programs.

PMID: 25133305  [PubMed - indexed for MEDLINE]

Okamura K(1), Kosuge R(2), Kihira M(2), Fujita G(2).
OBJECTIVES:
Much work remains to improve rehabilitative interventions for driving-under-the-influence (DUI) offenders. There is heterogeneity of patterns of alcohol use, personality, and driving behaviour within DUI offenders, but little is known about how their appraisal of DUI differs. This study investigated within-offender variability in DUI-specific attitudinal variables.

METHOD:
Convicted male DUI offenders (N=219) living in greater Tokyo were interviewed. Cluster analysis was undertaken using age, psychological distress, personality trait, alcohol use, and attitudes towards DUI. Discriminant function analysis explored the relative explanatory power of the grouping variables.

RESULT:
Many offenders reported current excessive alcohol consumption. About 26-36% of the participants were potentially alcohol-dependent based on screening instruments/biomarkers. Cluster analysis identified five subgroups. The biggest subgroup considered their DUI a singular mistake and reported strong self-efficacy for avoiding further DUI (clusters 1 and 2). A small subgroup manifested alcohol dependence, psychological distress, higher impulsivity, and lower self-efficacy for avoiding DUI (cluster 3). Another subgroup exhibited a tendency to rationalise DUI, higher likelihood of future DUI, and lower self-efficacy for avoiding DUI (cluster 4). Most participants in another small subgroup abstained from alcohol use temporarily after their convictions (cluster 5).

CONCLUSION:
The majority of DUI offenders regarded their DUI conviction as an exceptional mishap, while they continued consuming hazardous amounts of alcohol. DUI-specific attitudinal variables, including DUI rationalisation and self-efficacy for avoiding future DUI incidents, constituted a distinct aspect of the problem, suggesting the need to address this issue in addition to the underlying alcohol use problem.

PMID: 25123346 [PubMed - indexed for MEDLINE]


OBJECTIVES:
We evaluated the public health benefits of traffic laws targeting speeding and drunk drivers (British Columbia, Canada, September 2010).

METHODS:
We studied fatal crashes and ambulance dispatches and hospital admissions for road trauma, using interrupted time series with multiple nonequivalent comparison series. We determined estimates of effect using linear regression models incorporating an autoregressive integrated moving average error term. We used neighboring jurisdictions (Alberta, Saskatchewan, Washington State) as external controls.

RESULTS:
In the 2 years after implementation of the new laws, significant decreases occurred in fatal crashes (21.0%; 95% confidence interval [CI]=15.3, 26.4) and in hospital admissions (8.0%; 95% CI=0.6, 14.9)
and ambulance calls (7.2%; 95% CI=1.1, 13.0) for road trauma. We found a very large reduction in alcohol-related fatal crashes (52.0%; 95% CI=34.5, 69.5), and the benefits of the new laws are likely primarily the result of a reduction in drinking and driving.

CONCLUSIONS:
These findings suggest that laws calling for immediate sanctions for dangerous drivers can reduce road trauma and should be supported.

PMCID: PMC4167084 PMID: 25121822 [PubMed - indexed for MEDLINE]


The impact on health of alcohol in a given society is mainly related with the volume and pattern of drinking, and these are related with individual factors, but also with environmental factors, among which public policies are important determinants. Public policies may favour or reduce alcohol use, and thus have a substantial preventive capacity. The effectiveness of policies to prevent the harm caused by alcohol has been reviewed in recent documents, which provide evidence to extract recommendations. This paper reviews the most effective policies to reduce the harm caused by alcohol, with an emphasis in the use of taxes to increase its cost, availability regulation, and policies on drinking and driving. The regulation of alcohol promotion and publicity is also assessed, as well as the detection and treatment of alcohol abuse and dependence. The state of alcohol related policies in Spain is analysed, as well as the obstacles, for the adoption of policies more prone to prevention, and recommendations for the future are made.

PMID: 25090407 [PubMed - indexed for MEDLINE]


OBJECTIVE:
Previous studies have already shown the possibility of impairment during a hangover phase, after alcohol ingestion, when the blood alcohol concentration has returned to zero. The prevalence of drivers being in a hangover phase, in the driving population, and the relation to impairment relevant for traffic safety has, however, not been previously studied. The aim of this study was to investigate the prevalence and the concentrations of the 2 ethanol metabolites, ethyl glucuronide (EtG) and ethyl sulfate (EtS), in blood, indicating very recent alcohol intake, among apprehended drivers, in which no psychoactive substances, including alcohol, were detected. The aim was also to study these findings in relation to the impairment observed in these drivers.

METHODS:
Blood samples, drawn from suspected drunk or drugged drivers, were analyzed for a broad repertoire of psychoactive substances, with a clinical test for impairment (CTI) being performed at the same time. One hundred and forty-six cases, in which no psychoactive substances were detected and where a valid CTI was performed, were analyzed for EtG and EtS in blood. The prevalence and concentrations were related to the conclusions of the CTIs.

RESULTS:
EtS and EtG were detected in a total of 19 of the 146 cases (13%). Among the "impaired" drivers, EtG and EtS were detected in 16 cases (18%), whereas among "not impaired" drivers they were detected
in 3 cases (5%). There were significantly more detections of EtS (and EtG) among the impaired group of drivers compared to the nonimpaired drivers (P =.030), and the concentrations of both EtG (P =.027) and EtS (P =.026) were significantly higher in the group of impaired drivers compared to the nonimpaired drivers. There was a statistically significant positive correlation between the concentrations of EtG (Spearman’s rho = 0.170, P =.041) and EtS (Spearman’s rho = 0.189, P =.022) and the degree of impairment.

CONCLUSIONS:
EtG and EtS were prevalent findings in blood collected from the apprehended drivers, testing negative for all psychoactive substances. The higher rates of detections of EtG and EtS in impaired compared to nonimpaired drivers, and also the positive correlation between concentrations of EtG and EtS and the degree of impairment, indicate that hangover symptoms may be relevant for traffic safety.

PMID: 25023858  [PubMed - indexed for MEDLINE]

Anund A(1), Antonson H, Ihlström J.

INTRODUCTION:
There is a common understanding that driving under the influence of alcohol is associated with higher risk of being involved in crashes with injuries and possible fatalities as the outcome. Various countermeasures have therefore from time to time been taken by the authorities to prevent drunk driving. One of them has been the alcohol interlock. Up to now, interlocks have mainly been used by previously convicted drunk drivers and in the commercial road transport sector, but not in private cars.

OBJECTIVE AND METHOD:
New technology has today reached a level where broader implementation might be possible. To our knowledge, however, little is known about different stakeholders' opinions of a broader implementation of such systems. In order to increase that knowledge, we conducted a focus group study to collect in-depth thoughts from different stakeholders on this topic. Eight focus groups representing a broad societal span were recruited and conducted for the purpose.

RESULTS AND CONCLUSIONS:
The results show that most stakeholders thought that an integrated system for alcohol detection in vehicles might be beneficial in lowering the number of drunk driving crashes. They said that the system would probably mainly prevent driving by people who unintentionally and unknowingly drive under the influence of alcohol. The groups did, however, not regard the system as a final solution to the drunk driving problem, and believed that certain groups, such as criminals and alcoholics, would most likely find a way around the system. Concerns were raised about the risk of increased sleepy driving and driving just under the legal blood alcohol concentration (BAC) limit. The results also indicate that stakeholders preferred a system that provides information on the BAC up to the legal limit, but not for levels above the limit; for those, the system should simply prevent the car from starting. Acceptance of the system depended on the reliability of the system, on its ability to perform fast sampling, and on the analytical process, as well as the system's more or less inconspicuous placement and user-friendliness. The stakeholders thought that drivers would probably not voluntarily demand the system. So if broad implementation was desired, it would have
to be made compulsory by legislation. As an incentive to increase demand, lower taxes and insurance premiums were suggested.

PMID: 25022221 [PubMed - indexed for MEDLINE]


The purpose of this study is to provide an overview of the variation in the prevalence of alcohol in everyday traffic in the Netherlands during all days of the week and all times of day. Breath tests were taken from randomly selected car drivers and drivers of small vans in six police regions in the Netherlands between January 2007 and August 2009. A total of 28,057 drivers were included in the study. The prevalence of driving under the influence of alcohol was highest during night-time hours of weekend days. Large proportions of sampled drivers under the influence of alcohol were also found during day-time hours on weekend days, especially early in the morning and early in the evening. Furthermore, a small proportion of sampled drivers under the influence of alcohol was found during morning traffic on Monday and Friday mornings. The results of this study indicate that drink driving is not only limited to night-time hours and that prevalence of drink driving is also high during evening hours from Wednesday to Sunday. In addition to these time periods, breath testing activities may also be effective from a police enforcement perspective on Monday, Friday, and Saturday mornings between 06.00h and 08.00h and on Sunday mornings until 10.00h.

PMID: 24997677 [PubMed - indexed for MEDLINE]


OBJECTIVE:
Illegal drug use is a persistent problem, prescription drug abuse is on the rise, and there is clinical evidence that drug use reduces driving performance. This study describes trends in characteristics of drivers involved in fatal motor vehicle crashes who test positive for drugs.

METHODS:
We used the Fatality Analysis Reporting System—a census of motor vehicle crashes resulting in at least one fatality on U.S. public roads—to investigate suspected drug use for the period 1993-2010.

RESULTS:
Drugged drivers who were tested for drug use accounted for 11.4% of all drivers involved in fatal motor vehicle crashes in 2010. Drugged drivers are increasingly likely to be older drivers, and the percentage using multiple drugs increased from 32.6% in 1993 to 45.8% in 2010. About half (52.4%) of all drugged drivers used alcohol, but nearly three-quarters of drivers testing positive for cocaine also used alcohol. Prescription drugs accounted for the highest fraction of drugs used by drugged drivers in fatal crashes in 2010 (46.5%), with much of the increase in prevalence occurring since the mid-2000s.

CONCLUSIONS:
The profile of a drugged driver has changed substantially over time. An increasing share of these drivers is now testing positive for prescription drugs, cannabis, and multiple drugs. These findings
have implications for developing interventions to address the changing nature of drug use among drivers in the U.S.

PMCID: PMC4037460 PMID: 24982537 [PubMed - indexed for MEDLINE]

Elevated alcohol demand is associated with driving after drinking among college student binge drinkers.
Teeters JB(1), Pickover AM, Dennhardt AA, Martens MP, Murphy JG.

BACKGROUND:
Alcohol-impaired driving among college students represents a significant public health concern, yet little is known about specific theoretical and individual difference risk factors for driving after drinking among heavy drinking college students. This study evaluated the hypothesis that heavy drinkers with elevated alcohol demand would be more likely to report drinking and driving.

METHOD:
Participants were 207 college students who reported at least 1 heavy drinking episode (4/5 or more drinks in 1 occasion for a woman/man) in the past month. Participants completed an alcohol purchase task that assessed hypothetical alcohol consumption across 17 drink prices and an item from the Young Adult Alcohol Consequences Questionnaire that assessed driving after drinking.

RESULTS:
In binary logistic regression models that controlled for drinking level, gender, ethnicity, age, and sensation seeking, participants who reported higher demand were more likely to report driving after drinking.

CONCLUSIONS:
These results provide support for behavioral economics models of substance abuse that view elevated/inelastic demand as a key etiological feature of substance misuse.

PMID: 24948397 [PubMed - indexed for MEDLINE]

The effects of moderate alcohol concentrations on driving and cognitive performance during ascending and descending blood alcohol concentrations.
Starkey NJ(1), Charlton SG.

OBJECTIVE:
Alcohol has an adverse effect on driving performance; however, the effects of moderate doses on different aspects of the driving task are inconsistent and differ across the intoxication curve. This research aimed to investigate driving and cognitive performance asymmetries (acute tolerance and acute protracted error) accompanying the onset and recovery from moderate alcohol consumption.

METHODS:
Sixty-one participants received a placebo, medium (target blood alcohol concentration [BAC] 0.05 mg/ml) or high (target BAC 0.08 mg/ml) dose of alcohol. Participants completed a simulated drive, cognitive tests and subjective rating scales five times over a 3.5 h period.

RESULTS:
When ascending and descending BACs (0.05 and 0.09 mg/ml) were compared participants' self-ratings of intoxication and willingness to drive showed acute tolerance. Acute protracted errors
were observed for response speed, maze learning errors, time exceeding the speed limit and exaggerated steering responses to hazards.

CONCLUSIONS:
Participants’ estimates of their level of intoxication were poorly related to their actual BAC levels (and hence degree of impairment), and various aspects of driving and cognitive performance worsened during descending BACs. This indicates that drivers are not good at judging their fitness to drive after drinking only moderate amounts of alcohol and suggests an important focus for public education regarding alcohol and driving.

PMID: 24930981 [PubMed - indexed for MEDLINE]

Acute effects of alcohol on inhibitory control and simulated driving in DUI offenders.
Van Dyke N(1), Fillmore MT(2).

INTRODUCTION:
The public health costs associated with alcohol-related traffic accidents have prompted considerable research aimed at identifying characteristics of individuals who drive under the influence (DUI) in order to improve treatment and prevention strategies. Survey studies consistently show that DUI offenders self-report higher levels of impulsivity compared to their nonoffending counterparts. However, little is known about how individuals with a DUI history respond under alcohol. Inhibitory control is a behavioral component of impulsivity thought to underlie risky drinking and driving behaviors.

METHOD:
The present study examined the degree to which DUI drivers display deficits of inhibitory control in response to alcohol and the degree to which alcohol impaired their simulated driving performance. It was hypothesized that DUI offenders would display an increased sensitivity to the acute impairing effects of alcohol on simulated driving performance. Young adult drivers with a history of DUI and a demographically-comparable group of drivers with no history of DUI (controls) were tested following a 0.65 g/kg dose of alcohol and a placebo. Inhibitory control was measured by using a cued go/no-go task. Drivers then completed a driving simulation task that yielded multiple indicators of driving performance, such as within-lane deviation, steering rate, centerline crossings and road edge excursions, and drive speed.

RESULTS:
Results showed that although DUI offenders self-reported greater levels of impulsivity than did controls, no group differences were observed in the degree to which alcohol impaired inhibitory control and driving performance. The findings point to the need to identify other aspects of behavioral dysfunction underlying the self-reported impulsivity among DUI offenders, and to better understand the specific driving situations that might pose greater risk to DUI offenders.

PRACTICAL APPLICATIONS:
The systematic study of candidate cognitive deficits in DUI offenders will provide important information on their role in risky driving behavior and decisions to drink and drive. Such information is critical for guiding new interventions for DUI offenders that will move treatment beyond general addiction counseling.

PMCID: PMC4052213 PMID: 24913486 [PubMed - indexed for MEDLINE]
26. Nervenarzt. 2014 Jul;85(7):816-21. doi: 10.1007/s00115-013-3993-3. [Driving ability with alcohol and drug dependence and schizophrenia]. [Article in German] Soyka M(1), Dittert S, Kagerer-Volk S, Soyka M. Alcohol and drugs use are of great relevance for driving ability. The number of alcohol-related accidents with injuries in Germany showed a 40% decline over the past decade (2011: 15,898 including 400 deaths, other drugs 1400). Road surveys indicate the risk of accidents to be high in psychostimulant users but only medium in opioid users. Guidelines for medical and psychological examinations of drunken drivers are given. Alcohol-related questions are the most commonly encountered in medical psychological expert opinions with 51% followed by drugs and medications with 21%. The fundamental principles of expert opinions are presented. At last count the proportion of all investigated persons who tested positive was 55%. In the absence of other health-related limitations, most patients under substitution therapy for opiate addiction are barely impaired in the cognitive functions relevant for driving ability. The database for traffic offences and schizophrenia is much worse. Acute psychotic illness rules out driving ability. In patients with first onset disease this can usually be granted after 1 year of remission from symptoms but in cases of repeated exacerbations longer intervals of 3-5 years are warranted. PMID: 24906534 [PubMed - indexed for MEDLINE]

27. J Anal Toxicol. 2014 Sep;38(7):444-50. doi: 10.1093/jat/bku050. Epub 2014 Jun 3. Detection and prevalence of drug use in arrested drivers using the Dräger Drug Test 5000 and Affiniton DrugWipe oral fluid drug screening devices. Logan BK(1), Mohr AL(2), Talpins SK(3). Comment in J Anal Toxicol. 2015 May;39(4):330-1. J Anal Toxicol. 2015 May;39(4):332-3. The use of oral fluid (OF) drug testing devices offers the ability to rapidly obtain a drug screening result at the time of a traffic stop. We describe an evaluation of two such devices, the Dräger Drug Test 5000 and Affiniton DrugWipe, to detect drug use in a cohort of drivers arrested from an investigation of drug impaired driving (n = 92). Overall, 41% of these drivers were ultimately confirmed positive by mass spectrometry for the presence of one or more drugs. The most frequently detected drugs were cannabinoids (30%), benzodiazepines (11%) and cocaine (10%). Thirty-nine percent of drivers with blood alcohol concentrations >0.08 g/100 mL were found to be drug positive. Field test results obtained from OF samples were compared with collected OF and urine samples subsequently analyzed in the laboratory by gas or liquid chromatography-mass spectrometry. The Dräger Drug Test 5000 (DDT5000) and DrugWipe returned overall sensitivities of 51 and 53%, and positive predictive values of 93 and 63%, respectively. The most notable difference in performance was the DDT5000’s better sensitivity in detecting marijuana use. Both devices failed to detect benzodiazepine use. Oral fluid proved to be a more effective confirmatory specimen, with more drugs being confirmed in OF than urine. PMID: 24894458 [PubMed - indexed for MEDLINE]

28. Accid Anal Prev. 2014 Oct;71:22-8. doi: 10.1016/j.aap.2014.05.006. Epub 2014 May 27. Sensation seeking and drunk driving: the mediational role of social norms and self-efficacy. González-Iglesias B(1), Gómez-Fraguela JA(2), Luengo MÁ(2). The aim of this work was to examine the role of sensation seeking in drunk driving by youths, and the potential mediational effect of social, cognitive and emotional variables on their relationship. To this end, a survey was conducted on 274 drivers (164 females and 110 males) aged 24.36±2.96 years.
(range 18-30 years). The results obtained confirm the significance of sensation seeking to drunk driving by youths and the mediating role of biased self-efficacy perceptions in their relationship. The important practical implications of this finding on the development of effective interventions to prevent the risks of drunk driving in youths are discussed.

PMID: 24878692 [PubMed - indexed for MEDLINE]

Sun Y(1), Huang Z, Zhao Z, Jiang Y, Ye Y, Yu T, Rao Y.

OBJECTIVE:
The purpose of our study was to better characterize and evaluate drunk driving for governmental reference in order to further reduce alcohol-impaired driving.

METHOD:
This article reports the characteristics of 1226 alcohol-positive drivers with blood alcohol concentrations (BACs) at or over the legal limit of 0.20 mg/mL involved in nonfatal traffic accidents in Shanghai, China, from 2008 to 2011. The mean BAC, age, and gender of these drivers are discussed as well as the vehicle types and times of day when the crashes occurred.

RESULTS:
The mean BAC was 1.41 mg/mL and the mean age was 38 years old, and the vast majority of drivers were male (96.9%). The mean BAC of male drivers (1.42 mg/mL) was higher than that of female drivers (1.20 mg/mL). The mean age of male drivers (38) was also higher than that of female drivers (33). Distributions of vehicle types involved were studied. Cars had the highest percentage of occurrences (56.4%), followed by motorcycles (32.8%), electric bicycles (6.8%), trucks (1.5%), and bicycles (0.8%). It was found that these alcohol-related traffic crashes most often occurred between 7:00 p.m. and 10:59 p.m., representing 48.1 percent (n = 590) of the 1226 cases. Single-vehicle crashes were overrepresented (70.3%) in all cases. The mean BAC in multivehicle crashes (1.69 mg/mL) was higher than that in single-vehicle crashes (1.30 mg/mL). CONCLUSIONS: The results indicated a notable need for more governmental attention that would prevent accidents caused by driving under the influence of alcohol.

PMID: 24867564 [PubMed - indexed for MEDLINE]

Child passenger deaths involving alcohol-impaired drivers.
Quinlan K(1), Shults RA(2), Rudd RA(2).

BACKGROUND AND OBJECTIVE:
Approximately 1 in 5 child passenger deaths in the United States involves an alcohol-impaired driver, most commonly the child's own driver. The objective of this study was to document recent trends and state-specific rates of these deaths.

METHODS:
A descriptive analysis of 2001-2010 Fatality Analysis Reporting System data for child passengers aged <15 years killed in alcohol-impaired driving crashes. Driver impairment was defined as a blood alcohol concentration of ≥0.08 g/dL.
RESULTS:
During 2001-2010, 2344 children <15 years were killed in crashes involving at least 1 alcohol-impaired driver. Of these children, 1515 (65%) were riding with an impaired driver. Annual deaths among children riding with an alcohol-impaired driver decreased by 41% over the decade. Among the 37 states included in the state-level analysis, Texas (272) and California (135) had the most children killed while riding with an impaired driver and South Dakota (0.98) and New Mexico (0.86) had the highest annualized child passenger death rates (per 100 000 children). Most (61%) child passengers of impaired drivers were unrestrained at the time of the crash. One-third of the impaired drivers did not have a valid driver's license.

CONCLUSIONS:
Alcohol-impaired driving remains a substantial threat to the safety of child passengers in the United States, and typically involves children being driven by impaired drivers. This risk varies meaningfully among states. To make further progress, states and communities could consider increased use of effective interventions and efforts aimed specifically at protecting child passengers from impaired drivers.

PMID: 24795941 [PubMed - indexed for MEDLINE]

Rudisill TM(1), Zhao S(2), Abate MA(3), Coben JH(4), Zhu M(5).

OBJECTIVE:
Driving under the influence of drugs is a global traffic safety and public health concern. This trend analysis examines the changes in general drug usage other than alcohol, broad categories, and typical prescription and illegal drugs among drivers fatally injured in motor vehicle crashes from 1999 to 2010 in the U.S.

METHODS:
Data from the Fatality Analysis Reporting System were analyzed from 1999 to 2010. Drug prevalence rates and prevalence ratios (PR) were determined comparing rates in 2009-2010 to 1999-2000 using a random effects model. Changes in general drug usage, broad categories, and representative prescription and illegal drugs including, methadone, oxycodone, hydrocodone, barbiturates, benzodiazepines, and cocaine, were explored.

RESULTS:
Comparing 2009-2010 to 1999-2000, prevalence of drug usage increased 49% (PR=1.49; 95% confidence interval [CI] 1.42, 1.55). The largest increases in broad drug categories were narcotics (PR=2.73; 95% CI 2.41, 3.08), depressants (PR=2.01; 95% CI 1.80, 2.25), and cannabinoids (PR=1.99; 95% CI 1.84, 2.16). The PR were 6.37 (95% CI 5.07, 8.02) for hydrocodone/oxycodone, 4.29 (95% CI 2.88, 6.37) for methadone, and 2.27 (95% CI 2.00, 2.58) for benzodiazepines. Barbiturates declined in rate over the 12-year period (PR=0.53; 95% CI 0.37, 0.75). Cocaine use increased until 2005 then progressively declined, though the rate remained relatively unchanged (PR=0.94; 95% CI 0.84, 1.06).
**CONCLUSIONS:**
While more drivers are being tested and found drug-positive, there is evidence that a shift from illegal to prescription drugs may be occurring among fatally injured drivers in the U.S. Driving under the influence of prescription drugs is a growing traffic concern.

**PMCID:** PMC4064831 [Available on 2015-09-01] **PMID:** 24793428  [PubMed - indexed for MEDLINE]

It's five o'clock somewhere: An examination of the association between happy hour drinking and negative consequences.
Baldwin JM(1), Stogner JM, Miller BL.

**BACKGROUND:**
This study aims to understand which young adults' drinking behaviors change in the presence of happy hour specials, the ways in which they change, and whether a link exists between happy hour drinking behavior and negative outcomes.

**METHODS:**
Using data collected from bar-going respondents (n = 1,423) within a print survey administered to a general college sample (n = 2,349), we identify significant differences in changes in happy hour behavior between demographic groups using $\chi^2$ tests and determine whether this behavior is related to six negative alcohol-related outcomes using logistical and ordinary least squares regression models with a variety of controls, including age of onset and frequency of use.

**RESULTS:**
Women, students under 21, non-athletes, members of Greek-affiliated organizations, more affluent and unemployed students, and students living on campus were more likely to change their drinking behavior in the presence of happy hour specials. In general, the most robust predictors of negative events are gender, alcohol use frequency, age of alcohol use onset, and increasing drinking due to happy hours/bar specials. While it was linked to various negative and illegal behaviors, altered happy hour drinking was not associated with an increased likelihood of an alcohol-related arrest.

**CONCLUSIONS:**
This study lends support to the idea that alcohol price specials should be regulated in an effort to reduce high consumption and alcohol-related negative consequences. Future research into the relationship between happy hour drinking and negative outcomes is necessary and should examine the impact of happy hour advertisements, different types of specials, and the timing of happy hours.

**PMCID:** PMC4017966 **PMID:** 24758616  [PubMed - indexed for MEDLINE]

Re: driving intoxicated: is hospital admission protective against legal ramifications?
**PMID:** 24747476  [PubMed - indexed for MEDLINE]

Driving intoxicated: is hospital admission protective against legal ramifications?
**PMID:** 24747475  [PubMed - indexed for MEDLINE]

PMID: 24745645 [PubMed - indexed for MEDLINE]

Publicized sobriety checkpoint programs: a community guide systematic review.
Bergen G(1), Pitan A(2), Qu S(2), Shults RA(3), Chattopadhyay SK(2), Elder RW(2), Sleet DA(3), Coleman HL(4), Compton RP(4), Nichols JL(4), Clymer JM(5), Calvert WB(6); Community Preventive Services Task Force.

CONTEXT:
Publicized sobriety checkpoint programs deter alcohol-impaired driving by stopping drivers systematically to assess their alcohol impairment. Sobriety checkpoints were recommended in 2001 by the Community Preventive Services Task Force for reducing alcohol-impaired driving, based on strong evidence of effectiveness. Since the 2001 review, attention to alcohol-impaired driving as a U.S. public health problem has decreased. This systematic review was conducted to determine if available evidence supports the effectiveness of publicized sobriety checkpoint programs in reducing alcohol-impaired driving, given the current context. The economic costs and benefits of the intervention were also assessed.

EVIDENCE ACQUISITION:
This review focused on studies that evaluated the effects of publicized sobriety checkpoint programs on alcohol-involved crash fatalities. Using Community Guide methods, a systematic search was conducted for studies published between July 2000 and March 2012 that assessed the effectiveness of publicized sobriety checkpoint programs.

EVIDENCE SYNTHESIS:
Fourteen evaluations of selective breath testing and one of random breath testing checkpoints met the inclusion criteria for the systematic review, conducted in 2012. Ten evaluations assessed the effects of publicized sobriety checkpoint programs on alcohol-involved crash fatalities, finding a median reduction of 8.9% in this crash type (interquartile interval=-16.5%, -3.5%). Five economic evaluations showed benefit-cost ratios ranging from 2:1 to 57:1.

CONCLUSIONS:
The number of studies, magnitude of effect, and consistency of findings indicate strong evidence of the effectiveness of publicized sobriety checkpoint programs in reducing alcohol-involved crash fatalities. Economic evidence shows that these programs also have the potential for substantial cost savings.

PMID: 24745644 [PubMed - indexed for MEDLINE]

Increased collision risk among drivers who report driving after using alcohol and after using cannabis.

PMID: 24735704 [PubMed - indexed for MEDLINE]
The problem of suspended and revoked drivers who avoid detection at checkpoints.
Parrish KE(1), Masten SV.

OBJECTIVE:
Although driver license suspension and revocation have been shown to improve traffic safety, suspended or revoked (SR) drivers who continue to drive—which appears to be the majority—are about 3 times more likely to be involved in crashes and to cause a fatal crash. In California and many other U.S. states, drivers are typically mailed notices requesting that they surrender their licenses when they are SR for reasons other than driving under the influence of alcohol or drugs (DUI), yet they frequently do not comply. Typical procedures at DUI checkpoints in California and other U.S. states include inspecting driver licenses and checking for signs of intoxication during brief contacts with law enforcement officers. Hence, these checkpoints are in fact DUI/license checkpoints in California and many other states. The purpose of this study was to estimate the extent to which SR drivers avoid being detected at DUI/license checkpoints for SR driving, because they illegally retained possession of their license cards.

METHOD:
Law enforcement officers used electronic license card readers at DUI/license checkpoints in Sacramento, California, to record data for 13,705 drivers. The SR status of all contacted drivers was determined after the checkpoints and compared to law enforcement citation records from the checkpoints.

RESULTS:
Although only 3% of the drivers contacted at the checkpoints were SR, about 41% of SR drivers were able to pass through undetected because they presented license cards that they illegally retained. Drivers SR for DUI-related reasons were more likely to be detected, whereas those SR for failure to provide proof of financial responsibility (insurance) were less likely to be detected.

CONCLUSION:
The fact that many SR drivers are able to pass through DUI/license checkpoints undetected weakens both the specific and general impacts of checkpoints for deterring SR driving and may diminish the effectiveness of suspension and revocation actions for reducing the crash risk posed by problem drivers. Using license card readers that can quickly identify SR drivers in real time during routine traffic stops and at DUI/license checkpoints warrants further consideration.

PMID: 24730601 [PubMed - indexed for MEDLINE]

"I drove after drinking alcohol" and other risky driving behaviours reported by young novice drivers.
Scott-Parker B(1), Watson B(2), King MJ(3), Hyde MK(4).

BACKGROUND:
Volitional risky driving behaviours such as drink- and drug-driving (i.e. substance-impaired driving) and speeding contribute to the overrepresentation of young novice drivers in road crash fatalities, and crash risk is greatest during the first year of independent driving in particular.

AIMS:
To explore the: (1) self-reported compliance of drivers with road rules regarding substance-impaired driving and other risky driving behaviours (e.g., speeding, driving while tired), one year after progression from a Learner to a Provisional (intermediate) licence; and (2) interrelationships
between substance-impaired driving and other risky driving behaviours (e.g., crashes, offences, and Police avoidance).

METHODS:
Drivers (n=1076; 319 males) aged 18-20 years were surveyed regarding their sociodemographics (age, gender) and self-reported driving behaviours including crashes, offences, Police avoidance, and driving intentions.

RESULTS:
A relatively small proportion of participants reported driving after taking drugs (6.3% of males, 1.3% of females) and drinking alcohol (18.5% of males, 11.8% of females). In comparison, a considerable proportion of participants reported at least occasionally exceeding speed limits (86.7% of novices), and risky behaviours like driving when tired (83.6% of novices). Substance-impaired driving was associated with avoiding Police, speeding, risky driving intentions, and self-reported crashes and offences. Forty-three percent of respondents who drove after taking drugs also reported alcohol-impaired driving.

DISCUSSION AND CONCLUSIONS:
Behaviours of concern include drink driving, speeding, novice driving errors such as misjudging the speed of oncoming vehicles, violations of graduated driver licensing passenger restrictions, driving tired, driving faster if in a bad mood, and active punishment avoidance. Given the interrelationships between the risky driving behaviours, a deeper understanding of influential factors is required to inform targeted and general countermeasure implementation and evaluation during this critical driving period. Notwithstanding this, a combination of enforcement, education, and engineering efforts appear necessary to improve the road safety of the young novice driver, and for the drink driving young novice driver in particular.

PMID: 24698806  [PubMed - indexed for MEDLINE]

Association between travel length and drug use among Brazilian truck drivers.
Sinagawa DM(1), De Carvalho HB, Andreuccetti G, Do Prado NV, De Oliveira KC, Yonamine M, Muñoz DR, Gjerde H, Leyton V.

OBJECTIVE:
To investigate whether the use of the stimulants amphetamines and cocaine by truck drivers in Brazil was related to travel length.

METHODS:
Truck drivers were randomly stopped by the Federal Highway Police on interstate roads in Sao Paulo State during morning hours from 2008 to 2011 and invited to participate in the project "Comandos de Saúde nas Rodovias" (Health Commands on the Roads). Participants were asked about the use of drugs, travel distance, and age, and gender was recorded. Samples of urine were collected and analyzed for amphetamine, benzylecgonine (a metabolite of cocaine), and carboxytetrahydrocannabinol (THC-COOH; a metabolite of cannabis) by immunological screening and quantification by gas chromatography-mass spectroscopy.

RESULTS:
Current use of amphetamine, cocaine, and cannabis was reported by 5.7%, 0.7%, and 0.3% of the truck drivers, respectively. Amphetamine, benzylecgonine, and THC-COOH were found in urine samples from 5.4%, 2.6%, and in 1.0% of the drivers, respectively. There was a significant association
between the positive cases for amphetamine and reported travel length; 9.9% of urine samples from drivers who reported travel length of more than 270 km were positive for amphetamine, and 10.9% of those drivers reported current use of amphetamines. In most cases, appetite suppressants containing amphetamines had been used, but the purpose was most often to stay awake and alert while driving. Truck drivers with travel length of more than 270 km had significantly higher odds ratio (OR) for having a urine sample that was positive for amphetamine when adjusted for age as confounding factor (OR = 9.41, 95% confidence interval [CI], 3.97-22.26). No significant association was found between the use of cocaine or cannabis and travel length.

CONCLUSION:
Truck drivers who reported driving more than 270 km had significantly higher frequencies of urine samples positive for amphetamine and reported significantly more frequent current use of amphetamines than those who reported shorter driving distances.

PMID: 24697351 [PubMed - indexed for MEDLINE]

Driving during alcohol hangover among dutch professional truck drivers.
Verster JC(1), Van Der Maarel MA, McKinney A, Olivier B, De Haan L.

OBJECTIVES:
Alcohol hangover may impair potentially dangerous daily activities such as driving a car or operating heavy machinery. The purpose of the present study was to determine (1) whether driving during alcohol hangover is a problem of concern among professional Dutch truck drivers and (2) to what extent they think their hangover state affects driving performance.

METHODS:
Three hundred forty-three professional truck drivers were interviewed at a Dutch trucker festival. In addition to demographics, data were gathered on normal driving, alcohol consumption and hangover, and driving style during alcohol hangover.

RESULTS:
More than half of the professional drivers who consume alcohol and report occasionally having a hangover (56.4%) acknowledge that they have driven while having a hangover during the past year: 26.5 percent only when driving private, 2.6 percent only when driving professionally, and 27.4 percent both private and professionally. Additionally, 45.3 percent reported driving while having a hangover sometimes, whereas 7.7 percent and 1.7 percent reported doing so often or always, respectively. During alcohol hangover, professional drivers rated their driving style as significantly less relaxed, less safe, and less responsible (P < .001).

CONCLUSIONS:
Driving with a hangover is a common phenomenon, and professional drivers acknowledge that their driving is impaired. Therefore, future experimental research should examine the magnitude of impairment while driving with an alcohol hangover.

PMID: 24678564 [PubMed - indexed for MEDLINE]

Commentary: Locked out or locked up: are ignition interlocks the answer?

PMID: 24655446 [PubMed - indexed for MEDLINE]

OBJECTIVE:
To examine the association between driving while alcohol/drug impaired (DWI) and the timing and amount of exposure to others’ alcohol/drug-impaired driving (riding while impaired [RWI]) and driving licensure timing among teenage drivers.

METHODS:
The data were from waves 1, 2, and 3 (W1, W2, and W3, respectively) of the NEXT Generation Study, with longitudinal assessment of a nationally representative sample of 10th graders starting in 2009-2010. Multivariate logistic regression was used for the analyses.

RESULTS:
Teenagers exposed to RWI at W1 (adjusted odds ratio [AOR] = 21.12, P <.001), W2 (AOR = 19.97, P < .001), and W3 (AOR = 30.52, P < .001) were substantially more likely to DWI compared with those reporting never RWI. Those who reported RWI at 1 wave (AOR = 10.89, P < .001), 2 waves (AOR = 34.34, P <.001), and all 3 waves (AOR = 127.43, P < .001) were more likely to DWI compared with those who never RWI. Teenagers who reported driving licensure at W1 were more likely to DWI compared with those who were licensed at W3 (AOR = 1.83, P <.05).

CONCLUSIONS:
The experience of riding in a vehicle with an impaired driver increased the likelihood of future DWI among teenagers after licensure. There was a strong, positive dose-response association between RWI and DWI. Early licensure was an independent risk factor for DWI. The findings suggest that RWI and early licensure could be important prevention targets.

PMCID: PMC3966504 PMID: 24639277 [PubMed - indexed for MEDLINE]


BACKGROUND:
A large proportion of road traffic crashes are related to driving under the influence (DUI) of alcohol or drugs. The aim of this study was to compare the use of alcohol, illegal drugs and psychoactive medicinal drugs among random drivers in Brazil and Norway, two countries with the same legal limit for drunk driving, but with marked differences in legislation history, enforcement and penalties for DUI, and to discuss any differences found.

METHODS:
Roadside surveys were conducted on Fridays and Saturdays between noon and midnight. Samples of oral fluid were collected for analysis of drugs, whereas alcohol was determined by breath testing or by analysis of oral fluid.

RESULTS:
High participation rates of 94-97% were obtained in both countries. The weighted prevalence of driving with alcohol concentrations in breath or oral fluid equivalent to blood alcohol concentrations (BAC) above 0.2g/L was 2.7% (95% CI 2.2-3.3) in Brazil and 0.2% (95% CI 0.0-0.5) in Norway. Stimulants (amphetamines or cocaine) were found in samples from 1.0% (95% CI 0.7-1.4) of drivers
in Brazil and 0.3% (95% CI 0.1-0.7) in Norway. The prevalence of amphetamines was highest among Brazilian truck drivers (3.6%; 95% CI 2.0-6.4). Tetrahydrocannabinol was found in samples from 0.5% (95% CI 0.3-0.8) of drivers in Brazil and 1.0% (95% CI 0.6-1.5) in Norway, whereas benzodiazepines or zopiclone were found in 1.0% (95% CI 0.7-1.4) and 1.7% (95% CI 1.2-2.4) of the samples from Brazil and Norway, respectively.

**CONCLUSIONS:**
The difference in the prevalence of alcohol may be related to the fact that Norway has implemented steps to reduce drunk driving since 1936, whereas Brazil has attempted to do the same for only a few years. Differences for drugs may be related to different patterns in the use of stimulants, cannabis and medicines.

*PMID: 24613265 [PubMed - indexed for MEDLINE]*

The arrest of drivers under the influence as a predictor of subsequent social disadvantage and death. Karjalainen K(1), Haukka J(2), Lillsunde P(3), Lintonen T(4), Mäkelä P(3).

**BACKGROUND:**
The association between DUI (driving under the influence) and disadvantaged social background has been shown in cross-sectional studies, but less is known about the processes behind this phenomenon. We aimed to examine the effect of DUI arrest on subsequent social disadvantage in Finland during 1993-2006 to provide more understanding about the dynamics of DUI and marginalization and to study DUI arrest as a potential point of intervention.

**METHODS:**
In this longitudinal, register-based study the Register of DUI suspects (n=68894) was linked with the Employment Register. An age- and gender-matched reference population (n=67740) was drawn from the general Finnish population. A multi-state model was used to estimate the transition intensities between three different states (advantaged social status/disadvantaged social status/death) among three different DUI groups (alcohol only, prescription drugs, illicit drugs).

**RESULTS:**
Compared to references, the movement of DUI suspects between different social states was more dynamic in that they were more likely to either move to a disadvantaged social state or to an improved status (except DUI suspects using prescription drugs). A DUI's relative risk of death compared to references was high, especially if currently in advantaged social status. The effect of DUI did not diminish over time.

**CONCLUSIONS:**
Driving under the influence is associated with an increased long-term risk for social disadvantage. DUI arrest could serve as an opportunity for intervention in the marginalization process.

*PMID: 24566278 [PubMed - indexed for MEDLINE]*

Effects of alcohol hangover on simulated highway driving performance. Verster JC(1), Bervoets AC, de Klerk S, Vreman RA, Olivier B, Roth T, Brookhuis KA.
BACKGROUND:
The purpose of this study was to examine the effects of alcohol hangover on simulated highway driving performance.

METHODS:
Driving performance of forty-two social drinkers was tested the morning following an evening of consuming on average 10.2 (SD = 4.2) alcoholic drinks (alcohol hangover) and on a control day (no alcohol consumed). Subjects performed a standardized 100-km highway driving test in the STISIM driving simulator. In addition to the standard deviation of lateral position (SDLP; i.e., the weaving of the car), lapses of attention were examined. Self-reported driving quality and driving style were scored, as well as mental effort to perform the test, sleepiness before and after driving, and hangover severity.

RESULTS:
Driving performance was significantly impaired during alcohol hangover as expressed by an SDLP increase of +1.9 cm (t (1,41) = 2.851, p = 0.007), increased number of lapses relative to the control day (7.7 versus 5.3 lapses, t (1,41) = 2.125, p = 0.019), and an increased total lapse time (182.7 versus 127.3 s, p = 0.040). During alcohol hangover, subjects reported their driving quality to be significantly poorer (t (1,41) = 4.840, p = 0.001) and less safe (t (1,41) = 5.078, p = 0.001), wise (t (1,41) = 4.061, p = 0.001), predictable (t (1,41) = 3.475, p = 0.001), and responsible (t (1,41) = 4.122, p = 0.001). Subjects further reported being significantly more tense while driving (t (1,41) = 3.280, p = 0.002), and more effort was needed to perform the driving test (t (1,41) = 2.941, p = 0.001). There was a significant interaction with total sleep time and hangover effects on SDLP and the number of lapses.

CONCLUSIONS:
In conclusion, driving is significantly impaired during alcohol hangover, as expressed in an elevated SDLP and increased number of lapses. Total sleep time has a significant impact on the magnitude of driving impairment.

PMID: 24563184 [PubMed - indexed for MEDLINE]

The effect on problematic drinking behavior of a brief motivational interview shortly after a first arrest for driving under the influence of alcohol: a randomized trial.

BACKGROUND:
In medical settings, motivational interviewing-based "brief intervention" (BI) counseling reduces alcohol-related risk-taking behavior and harm in high-risk populations. Individuals arrested for driving under the influence of alcohol (DUI) are another at-risk population. We sought to determine whether a BI administered shortly after a first DUI arrest might decrease problematic drinking behavior.

METHODS:
We conducted a single-center, parallel-group, double-blinded superiority randomized trial (NCT01270217), enrolling first-time DUI arrestees at a county jail from December 2010 through April 2011. Before their release, we randomized participants by computer-generated sequence to either a single BI or no discussion. We assessed 90-day change in Alcohol Use Disorders Identification Test
(AUDIT) scores (range 0-40, higher values indicating more problematic drinking) as the primary outcome.

RESULTS:
We enrolled 200 subjects (100 to each arm), and 181 (90.5%, 86 control and 95 BI) completed the 90-day follow-up. Mean (SD) age was 30 (10) years, and 50% were men. Mean (SD) blood alcohol concentration upon arrest was 0.14% (0.04%). Mean (SD) baseline AUDIT scores were 8.8 (5.8) among control subjects and 7.7 (6.3) among BI subjects. At 90 days, AUDIT scores decreased by a mean (SD) 4.7 (5.1) units among control subjects and 3.4 (5.0) among BI subjects (difference, -1.3; 95% confidence interval [CI], -2.8 to +0.1). The likelihood of subsequent binge drinking [relative risk (RR) 1.6; 95% CI, 0.8-3.0; BI vs. control], abstinence (RR, 0.9; 95% CI, 0.4-2.1), alcohol-related injury to self or others (RR, 0.4; 95% CI, 0.1-2.4), and seeking treatment (RR, 1.2; 95% CI, 0.8-1.7) did not differ.

CONCLUSION:
A single BI counseling session shortly after first-time DUI arrest does not reduce 90-day self-reported drinking behavior or increase seeking treatment for drinking beyond that which occurs without such a discussion.

LEVEL OF EVIDENCE:
Therapeutic study, level III.

PMID: 24553532 [PubMed - indexed for MEDLINE]


PMID: 24524536 [PubMed - indexed for MEDLINE]


Drugged driving is a safety issue of increasing public concern. Using data from the Fatality Analysis Reporting System for 1999-2010, we assessed trends in alcohol and other drugs detected in drivers who were killed within 1 hour of a motor vehicle crash in 6 US states (California, Hawaii, Illinois, New Hampshire, Rhode Island, and West Virginia) that routinely performed toxicological testing on drivers involved in such crashes. Of the 23,591 drivers studied, 39.7% tested positive for alcohol and 24.8% for other drugs. During the study period, the prevalence of positive results for nonalcohol drugs rose from 16.6% in 1999 to 28.3% in 2010 (Z = -10.19, P < 0.0001), whereas the prevalence of positive results for alcohol remained stable. The most commonly detected nonalcohol drug was cannabinoids, the prevalence of which increased from 4.2% in 1999 to 12.2% in 2010 (Z = -13.63, P < 0.0001). The increase in the prevalence of nonalcohol drugs was observed in all age groups and both sexes. These results indicate that nonalcohol drugs, particularly marijuana, are increasingly detected in fatally injured drivers.

PMCID: PMC3939850 PMID: 24477748 [PubMed - indexed for MEDLINE]
Ethylglucuronide in hair is a top predictor of impaired driving recidivism, alcohol dependence, and a key marker of the highest BAC interlock tests. Marques PR(1), Tippetts AS, Yegles M.

OBJECTIVES: This study focuses on the predictive and comparative significance of ethyl glucuronide measured in head hair (hEtG) for estimating risks associated with alcohol-impaired driving offenders. Earlier work compared different alcohol biomarkers for estimating rates of failed blood alcohol concentration (BAC) tests logged during 8 months of interlock participation. These analyses evaluate the comparative performance of several alcohol markers including hEtG and other markers, past driver records, and psychometric assessment predictors for the detection of 4 criteria: new driving under the influence (DUI) recidivism, alcohol dependence, and interlock record variables including fail rates and maximal interlock BACs logged.

METHODS: Drivers charged with alcohol impairment (DUI) in Alberta, Canada (n = 534; 64% first offenders, 36% multiple offenders) installed ignition interlock devices and consented to participate in research to evaluate blood-, hair-, and urine-derived alcohol biomarkers; sit for interviews; take psychometric assessments; and permit analyses of driving records and interlock log files. Subject variables included demographics, alcohol dependence at program entry, preprogram prior DUI convictions, postenrollment new DUI convictions, self-reported drinking assessments, morning and overall rates of failed interlock BAC tests, and maximal interlock BAC readings. Recidivism, dependence, high BAC, and combined fail rates were set as criteria; other variables were set as predictors. Area under the receiver operating characteristics (ROC) curve (A') estimates of sensitivity and specificity were calculated. Additional analyses were conducted on baseline hEtG levels. Driver performance and drinking indicators were evaluated against the standard hEtG cutoff for excessive drinking at (30 pg/mg) and a higher criterion of 50 pg/mg. HEtG splits were evaluated with the Mann-Whitney rank statistic.

RESULTS: HEtG emerged as a top overall predictor for discriminating new recidivism events that occur after interlock installation, for entry alcohol dependence, and for the highest interlock BACs recorded. Together, HEtG and phosphatidylethanol (Peth) were the top predictors of all criterion measures. By contrast, the hair-derived alcohol biomarkers hEtG and hFAEE (fatty acid ethylesters) were poorer than other alcohol biomarkers as detectors of interlock BAC test fail rates.

CONCLUSIONS: This study showed that hEtG, an objective alternative to often unreliable self-reported past representation of drinking levels, yields crucial insight into driver alcohol-related risks early in an interlock program and is a top predictor of new recidivist events. Together with Peth, these markers would be excellent anchors in a panel for detecting alcohol consumption.

PMID: 24471360 [PubMed - indexed for MEDLINE]
OBJECTIVES:
The purpose of this study was to evaluate the rate of, and risk factors for, subsequent impaired driving activity (IDA) in a cohort of injured passengers who were treated for injuries in a Canadian trauma center.

METHODS:
We studied adult passengers who were occupants in vehicles involved in motor vehicle crashes (MVCs) and either included in the British Columbia (BC) trauma registry (January 1, 1992-December 31, 2004) or treated in the emergency department (ED) of Vancouver General Hospital (VGH; January 1, 1999-December 31, 2003). Passengers were linked to their driver’s license and hence to their driving record using personal health number and demographic information. Injured passengers were stratified into 3 groups based on their blood alcohol concentration (BAC) at time of ED presentation: group 1: BAC = 0, group 2: 0 < BAC ≤ 17.3 mM (0.08%), group 3: BAC > 17.3 mM (0.08%).

Two outcome variables were studied: involvement in a subsequent IDA and time to their first subsequent IDA. IDA was defined as a criminal code conviction for impaired driving, a 24-h or 90-day license suspension for impaired driving, and/or involvement in an MVC where police cited alcohol as a factor. Time to first IDA following the index event among passenger BAC groups was compared with Kaplan-Meier survival analysis. Cox proportional hazards models were employed to examine the effect of various potential risk factors on time to engage in first IDA.

RESULTS:
Injured passengers with any BAC at the time of ED visit were more likely to engage in IDA and had their first IDA sooner after the index event than those with zero BAC. Among this cohort of injured passengers, 12.1 percent with BAC = 0, 29.9 percent with 0 < BAC ≤ 17.3 mM (0.08%), and 37.8 percent with a BAC > 17.3 mM (0.08%) engaged in IDA. Compared to passengers with BAC = 0, group 3 passengers and group 2 passengers were 2.06 times and 1.79 times more likely to engage in future IDA. Twenty-five percent of injured passengers engaged their first IDA by 57 and 38 months in groups 2 and 3, respectively. Previous IDA and being male were also significant risk factors for future IDA. Those with a history of IDA before the index event were 2.37 times more likely to engage in subsequent IDA.

CONCLUSIONS:
Injured alcohol-impaired passengers are at high risk for IDA and should be included in impaired driving prevention programs.

PMID: 24471359 [PubMed - indexed for MEDLINE]

Alcohol ignition interlocks in all new vehicles: a broader perspective.
Radun I(1), Ohisalo J, Rajalin S, Radun JE, Wahde M, Lajunen T.

OBJECTIVE:
To discuss the implications of widespread implementation of alcohol ignition interlocks.

METHOD:
We base our discussion on data from Finland including crash statistics and surveys collected from criminal justice professionals and general driving population.
RESULTS:
Alcohol ignition interlocks are an effective preventive measure against drunk driving when installed in the vehicles of convicted drunk drivers. However, once they are removed from the vehicles, drivers typically return to their habit of drinking and driving. Furthermore, for a number of reasons, the proportion of convicted drunk drivers that install an interlock in their vehicles is quite small. Therefore, many stakeholders believe that the solution to the drunk driving problem will come when interlocks become standard equipment in all new vehicles. However, drunk driving is a complex sociopsychological problem, and technology can rarely offer a solution to such complex problems. Consequently many aspects of such interventions might be difficult to identify and include in cost benefit analysis.

CONCLUSION:
We express caution about requiring an interlock as standard equipment in all new vehicles.

PMID: 24471356 [PubMed - indexed for MEDLINE]


Sobriety checkpoints are not usually randomly located by traffic authorities. As such, information provided by non-random alcohol tests cannot be used to infer the characteristics of the general driving population. In this paper a case study is presented in which the prevalence of alcohol-impaired driving is estimated for the general population of drivers. A stratified probabilistic sample was designed to represent vehicles circulating in non-urban areas of Catalonia (Spain), a region characterized by its complex transportation network and dense traffic around the metropolis of Barcelona. Random breath alcohol concentration tests were performed during spring 2012 on 7596 drivers. The estimated prevalence of alcohol-impaired drivers was 1.29%, which is roughly a third of the rate obtained in non-random tests. Higher rates were found on weekends (1.90% on Saturdays and 4.29% on Sundays) and especially at night. The rate is higher for men (1.45%) than for women (0.64%) and it shows an increasing pattern with age. In vehicles with two occupants, the proportion of alcohol-impaired drivers is estimated at 2.62%, but when the driver was alone the rate drops to 0.84%, which might reflect the socialization of drinking habits. The results are compared with outcomes in previous surveys, showing a decreasing trend in the prevalence of alcohol-impaired drivers over time.

PMID: 24456848 [PubMed - indexed for MEDLINE]


Driving vehicle under the influence of alcohol is the biggest cause of road traffic deaths worldwide. While extensive amount of interventions are advocated and implemented with the aim of preventing alcohol-impaired driving (AID) and related harm to the individual and the society, scientific evaluation of existing intervention has increasingly drawn attention. Although Japan has succeeded in reducing road fatalities caused by AID since 2000, scientific investigation into the consequences of existing intervention is scant. In the present work, a total of 10 published meta-analyses investigating effects of different interventions to prevent AID were reviewed, most of whose primary studies were conducted in North America. The majority of the interventions included
by the investigators of meta-analysis were based on the principle of general deterrence against AID, and relatively fewer meta-analyses investigating the effects of remedial treatment for convicted AID offenders were identified. The other categories of intervention meta-analysed were community-wide intervention or rehabilitation whose components was not limited to AID, but also included alcohol use problem and broader public health issues. Based on the results of the present review, overall evaluation of the interventions pertinent to preventing AID and future direction in conducting primary study was discussed.

PMID: 24427898 [PubMed - indexed for MEDLINE]

A study on the effects of fatigue driving and drunk driving on drivers' physical characteristics.
Zhang X(1), Zhao X, Du H, Rong J.

OBJECTIVE:
The purpose of this study was to analyze the effects of fatigue driving and drunk driving on drivers' physical characteristics; to analyze the differences in drivers' physical characteristics affected by different kinds of fatigue; and to compare the differences in the effects of the 2 driving states, fatigue driving and drunk driving.

METHODS:
Twenty-five participants' physical characteristics were collected under 5 controlled situations: normal, tired driving, drowsy driving, drowsiness + tired driving, and drunk driving. In this article, fatigue driving refers to tiredness and drowsiness and includes 3 situations: tired driving, drowsy driving, and drowsiness + tired driving. The drivers' physical characteristics were measured in terms of 9 parameters: systolic blood pressure (SBP), heart rate (HR), eyesight, dynamic visual acuity (DVA), time for dark adaption (TDA), reaction time to sound (RTS), reaction time to light (RTL), deviation of depth perception (DDP), and time deviation of speed anticipation (TDSA). They were analyzed using analysis of variance (ANOVA) with repeated measures. Binary logistical regression analysis was used to explain the relationship between drivers' physical characteristics and the two driving states.

RESULTS:
Most of the drivers' physical characteristic parameters were found to be significantly different under the influence of different situations. Four indicators are significantly affected by fatigue driving during deep fatigue (in decreasing order of influence): HR, RTL, SBP and RTS. HR and RTL are significant in the logistical regression model of the drowsiness + tired driving situation and normal situations. Six indicators of the drivers' physical characteristics are significantly affected by drunk driving (in decreasing order of influence):

- SBP
- RTL
- DDP
- Eyesight
- RTS
- TDSA.

SBP and DDP have a significant effect in the logistical regression model of the drunk driving situation and the normal situation.

CONCLUSIONS:
Both fatigue driving and drunk driving are found to impair drivers' physical characteristics. However, their impacts on the parameters SBP, HR, eyesight, and TDSA are different. A driver's physical
characteristics will be impaired more seriously when he continues driving while drowsy, compared to driving under normal situation. These findings contribute to the current research on identifying drivers' driving state and quantifying the effects of fatigue driving and drunk driving on driving ability and driving behavior.

PMID: 24433140  [PubMed - indexed for MEDLINE]


OBJECTIVE:
The purpose of this study was to determine (a) whether among sober (blood alcohol concentration [BAC] = .00%) drivers, being drug positive increases the drivers' risk of being killed in a fatal crash; (b) whether among drinking (BAC > .00%) drivers, being drug positive increases the drivers' risk of being killed in a fatal crash; and (c) whether alcohol and other drugs interact in increasing crash risk.

METHOD:
We compared BACs for the 2006, 2007, and 2008 crash cases drawn from the U.S. Fatality Analysis Reporting System (FARS) with control drug and blood alcohol data from participants in the 2007 U.S. National Roadside Survey. Only FARS drivers from states with drug information on 80% or more of the drivers who also participated in the 2007 National Roadside Survey were selected.

RESULTS:
For both sober and drinking drivers, being positive for a drug was found to increase the risk of being fatally injured. When the drug-positive variable was separated into marijuana and other drugs, only the latter was found to contribute significantly to crash risk. In all cases, the contribution of drugs other than alcohol to crash risk was significantly lower than that produced by alcohol.

CONCLUSIONS:
Although overall, drugs contribute to crash risk regardless of the presence of alcohol, such a contribution is much lower than that by alcohol. The lower contribution of drugs other than alcohol to crash risk relative to that of alcohol suggests caution in focusing too much on drugged driving, potentially diverting scarce resources from curbing drunk driving.

PMCID: PMC3893634 PMID: 24411797  [PubMed - indexed for MEDLINE]


The purpose of this investigation is to present an overview of roadside drug driving enforcement and detections in Queensland, Australia since the introduction of oral fluid screening. Drug driving is a problematic issue for road safety and investigations of the prevalence and impact of drug driving suggest that, in particular, the use of illicit drugs may increase a driver's involvement in a road crash when compared to a driver who is drug free. In response to the potential increased crash involvement of drug impaired drivers, Australian police agencies have adopted the use of oral fluid analysis to detect the presence of illicit drugs in drivers. This paper describes the results of roadside...
drug testing for over 80,000 drivers in Queensland, Australia, from December 2007 to June 2012. It provides unique data on the prevalence of methamphetamine, cannabis and ecstasy in the screened population for the period. When prevalence rates are examined over time, drug driving detection rates have almost doubled from around 2.0% at the introduction of roadside testing operations to just under 4.0% in the latter years. The most common drug type detected was methamphetamine (40.8%) followed by cannabis (29.8%) and methamphetamine/cannabis combination (22.5%). By comparison, the rate of ecstasy detection was very low (1.7%). The data revealed a number of regional, age and gender patterns and variations of drug driving across the state. Younger drivers were more likely to test positive for cannabis whilst older drivers were more likely to test positive for methamphetamine. The overall characteristics of drivers who tested positive to the presence of at least one of the target illicit drugs are they are likely to be male, aged 30-39 years, be driving a car on Friday, Saturday or Sunday between 6:00 pm and 6:00 am and to test positive for methamphetamine.

PMID: 24389088 [PubMed - indexed for MEDLINE]


OBJECTIVE:
Numerous studies have demonstrated that vehicle alcohol ignition interlocks installed on the cars of impaired-driving offenders reduce recidivism by approximately two-thirds in comparison to similar offenders whose licenses have been suspended. An unresolved issue is the extent to which the effectiveness of interlock programs can be improved by close monitoring of the offenders' performance while in the program. This article describes 5 types of monitoring currently being used in interlock programs in the United States.

METHODS:
The programs reviewed vary from those that simply ensure that the interlock is on the offender's vehicle and functioning, to those that use the interlock log data to extend the length of time the offender is required to be in the interlock program, and those that use the interlock data to initiate special monitoring and treatment programs that must be completed before removal of the interlock device. The strengths and limitations of each type of program are described. Also reviewed are current technological developments that appear to be leading to the development of fully automated interlock monitoring systems.

RESULTS:
Initial evidence shows that more intensive monitoring provides benefits in improved performance on the interlock, as indicated by fewer high blood alcohol concentration (BAC) breath tests when attempting to drive. Although effective, supervision that is more intensive increases government program costs.

CONCLUSIONS:
The relative cost-effectiveness of the differing types of monitoring requires investigation. Treatment programs need to be integrated with the interlock installation period. New technologies can potentially reduce interlock offender monitoring costs and effectiveness. Integrating treatment with the interlock could have postinterlock benefits.

PMID: 24380634 [PubMed - indexed for MEDLINE]
OBJECTIVE:
The objects of this study were: To review the state of drug-impaired driving in Canada, particularly in light of the 2008 amendments to the Criminal Code, which authorized police to demand standardized field sobriety testing and drug recognition evaluations, and to consider whether alternative enforcement models would be more effective in terms of detecting and prosecuting drug-impaired drivers and thereby achieve greater deterrence.

METHOD:
This article provides a review of survey data, roadside screening studies, and postmortem reports that indicate the prevalence of driving after drug use in Canada. It evaluates the Criminal Code’s 2008 amendments and their impact on charges and convictions for drug-impaired driving. It then reviews some alternative enforcement models for drug-impaired driving that have been adopted in other jurisdictions, particularly toxicological testing, and evaluates them against Canada’s social, political, and constitutional framework.

RESULTS:
Survey data, roadside screening studies, and postmortem reports indicate that driving after drug use is commonplace and is now more prevalent among young people than driving after drinking. Unfortunately, the 2008 Criminal Code amendments have not had their desired effects. The measures have proven to be costly, time-consuming, and cumbersome, and are readily susceptible to challenge in the courts. Accordingly, the charge rates for drug-impaired driving remain extremely low, and the law has had minimal deterrent effects. The review of alternative enforcement models suggests that a system of random roadside saliva screening, somewhat similar to the model used in Victoria, Australia, will be the most effective in terms of detecting and prosecuting drug-impaired drivers and most consistent with Canada’s legal and constitutional system.

CONCLUSIONS:
Canada should establish per se limits for the most commonly used drugs, enforceable through a system of screening and evidentiary tests. This will be more efficient and cost-effective and will result in more reliable evidence for criminal trials. Although this system will inevitably be subject to constitutional challenge, existing case law suggests that it should be upheld as a reasonable limit on constitutional rights.

PMID: 24380375 [PubMed - indexed for MEDLINE]
determine alcohol content and a sample of oral fluid to be tested for the presence of psychoactive drugs. The survey was conducted between the hours of 9:00 p.m. and 3:00 a.m. on Wednesday through Saturday nights in June 2010 and again in June 2012.

RESULTS:
Driving after drinking decreased significantly following the introduction of IRPs. In particular, the percentage of drivers with blood alcohol concentrations (BACs) over 80 mg/dL decreased by 59 percent; drivers with BACs of at least 50 mg/dL decreased by 44 percent. The decreases in drinking and driving were not restricted to specific subgroups of drivers but were universal across age groups, sex, and communities. The results also revealed a changing pattern of drinking of driving. For example, the typical pattern of increased drinking and driving on weekend nights was not observed and the prevalence of drinking drivers on the road during late night hours was less than half that found in 2010. The prevalence of drug use by drivers in 2012 did not change from the levels reported in 2010.

CONCLUSIONS:
The IRP program combined immediate short-term roadside suspensions with vehicle impoundment and monetary penalties to enhance the swiftness, certainty, and perceived severity of sanctions for drinking and driving. The introduction of these measures was associated with a substantial reduction in the prevalence of driving with a BAC over 50 mg/dL and driving with a BAC over 80 mg/dL.

PMID: 24372494 [PubMed - indexed for MEDLINE]

Violent behavior and driving under the influence of alcohol: prevalence and association with impulsivity among individuals in treatment for alcohol dependence in Poland.

BACKGROUND:
Driving while intoxicated or under the influence (DUI; for the purposes of this paper, we use the following terms synonymously: driving under the influence, driving while intoxicated, and drunk driving) and engaging in interpersonal violence are two injury-related problems of high public health importance that have both been linked to alcohol consumption. This study sought to estimate the prevalence of DUI and violence in a sample of individuals in treatment for alcohol dependence in Poland. Patient characteristics associated with DUI and violence involvement, with a particular focus on impulsivity, were examined.

METHODS:
Three hundred and sixty-four patients consecutively admitted to four alcohol treatment programs in Warsaw, Poland participated in this study. Questions concerning history of interpersonal violence as well as those about DUI were derived from the Michigan Alcoholism Screening Test. Impulsivity level was measured using the Barratt Impulsiveness Scale 11, the Revised NEO Personality Inventory, and the stop-signal task.

RESULTS:
Among all participants in the study, 148 (40.1%) had been arrested in the past for DUI, and 196 (55%) reported involvement in a fight under the influence of alcohol (FUI). The DUI group had a significantly earlier onset of alcohol problems, a longer period of heavy alcohol use, and fewer women in comparison to participants without a DUI history. FUI patients were significantly younger,
with a younger average age of onset of drinking problems, longer period of heavy drinking, and lower percentage of women than the non-FUI group.

**CONCLUSION:**
Both of the self-reported measures of impulsivity indicated a higher level of impulsivity among participants from the FUI group than those from the non-FUI group.

**PMID: 24356779 [PubMed - indexed for MEDLINE]**

An examination of the validity of the standardized field sobriety test in detecting drug impairment using data from the Drug Evaluation and Classification program.
Porath-Waller AJ(1), Beirness DJ.

**OBJECTIVE:**
The purpose of this study is to assess the validity of the 3 components of the Standardized Field Sobriety Test (SFST), including the Horizontal Gaze Nystagmus (HGN), One Leg Stand (OLS), and Walk and Turn (WAT) tests, in identifying impairment among suspected drug-impaired drivers using data recorded during drug evaluation and classification (DEC) evaluations.

**METHODS:**
Data from 2142 completed DEC evaluations of central nervous system (CNS) stimulants, CNS depressants, narcotic analgesics, cannabis, or no drugs were analyzed using multinomial logistic regression.

**RESULTS:**
All drug categories were significantly associated with impaired performance. On the HGN, users of CNS depressants were significantly more likely to experience lack of smooth pursuit and distinct nystagmus at maximum deviation compared to non-drug users. On the OLS, users of all drug classes were significantly more likely to sway while balancing and use their arms to maintain balance but significantly less likely to hop compared to drug-free cases. Users of CNS depressants, CNS stimulants, and narcotic analgesics were significantly more likely to put their raised foot down during the test. On the WAT, users of CNS depressants, CNS stimulants, and narcotic analgesics were significantly less likely to keep their balance while listening to test instructions compared to those who had not used drugs. Users of CNS depressants were less likely to touch heel-to-toe while walking, whereas individuals who had used narcotic analgesics were less likely to take the correct number of steps.

**CONCLUSIONS:**
These findings provide support for the use of the SFST as a screening tool for law enforcement to identify impairment in persons who have used CNS stimulants, CNS depressants, cannabis, or narcotic analgesics.

**PMID: 24345013 [PubMed - indexed for MEDLINE]**

Correlates of drug use and driving among undergraduate college students.
Kohn C(1), Saleheen H, Borrup K, Rogers S, Lapidus G.

**OBJECTIVE:**
Drug use by drivers is a significant and growing highway safety problem. College students are an important population to understand drugged driving. The objective of this study was to examine correlates of drugged driving among undergraduate college students.
METHODS:
We conducted an anonymous, confidential, 24-question survey at a large New England public university during the 2010-2011 academic year among undergraduates in courses that met a graduation requirement. Data include demographics; academics; housing status; lifestyle; personal values; high school/college drug use; and driving following alcohol use, drug use, or both; and as a passenger with a driver who used alcohol, drugs, or both. Descriptive statistics were calculated. Chi-square tests compared driver alcohol use, drug use, or both with demographic, academic, and lifestyle variables. Logistic regression analyses were performed with drugged driving as the dependent variable. Odds ratios and corresponding 95 percent confidence intervals were calculated for each of the potential explanatory variables in relation to the outcome.

RESULTS:
Four hundred forty-four of 675 students completed surveys (66% participation rate). Participants were representative of the student body with a mean age of 19.4 (±1.3 years), 51 percent male, 75 percent white, and 10 percent Hispanic. Seventy-eight percent lived on campus, 93 percent had a driver’s license, and 37 percent had access to a car. Students disagreed that cannabinoids impair driving (18%) compared to other drugs (17%), stimulants (13%), depressants (11%), hallucinogens (8%), and alcohol (7%). Twenty-three percent drove after alcohol use and 22 percent drove after drug use. Forty-one percent reported having been a passenger with a driver who had been drinking and 37 percent with a driver using drugs. Drugged driving was more likely among males vs. females (30% vs. 14%, P < .01), those living off campus (34% vs. 19%, P < .01), those reporting that parties are important (33% vs. 14%, P < .01), those reporting that parties are important (33% vs. 14%, P < .01), those reporting that community service is not important (28% vs. 18%, P < .05), those reporting that religion is not important (28% vs. 14%, P < .01), and those reporting personal drug use in high school (75% vs. 14%, P < .01) and well as that their best friends used drugs in high school (42% vs. 12%, P < .01) and college (50% vs. 8%, P < .01). Those factors most associated with drugged driving included using drugs in high school (odds ratio [OR] = 9.5, 95% confidence interval [CI]: 4.6-19.6) and best friends in college used drugs regularly (OR = 6.2, 95% CI: 3.4-11.6).

CONCLUSION:
Self-reported drugged driving and riding as a passenger with a drugged driver is common among subgroups of college students. The identification of undergraduate subgroups at risk for drugged driving will guide the design and implementation of traffic safety activities.

PMID: 24345012 [PubMed - indexed for MEDLINE]

Comparing drug detection in oral fluid and blood: data from a national sample of nighttime drivers.
Kelley-Baker T(1), Moore C, Lacey JH, Yao J.

OBJECTIVE:
The National Roadside Survey is a study undertaken in the United States to determine the prevalence of alcohol and drugs in randomly selected drivers. Following the success of a 2006 pilot study, the 2007 survey incorporated, for the first time, the collection of biological specimens for drug analysis. This article compares the results obtained from blinded analyses of pairs of oral fluid and blood samples obtained from the same subject.

METHODS:
During the 2007 survey, more than 7000 nighttime drivers were randomly stopped and surveyed for their self-reported drug use and were requested to donate an oral fluid specimen using the
Quantisal (Immunalysis Corporation, Pomona, CA) device and a blood sample. Overall, 5869 oral fluid specimens were collected from nighttime drivers with 3236 corresponding blood samples.

RESULTS:
Biological specimens were analyzed for a wide range of drugs. At nighttime, 14.4 percent of the drivers were positive for drugs in oral fluid, with just over half of those having marijuana present (7.6%). Of the 3236 pairs of specimens, 2676 were negative for all drugs, and 326 matched pairs of samples were both positive, out of which 247 (75.8%) were an exact match for all drug classes and 70 (21.5%) were positive for at least one common drug class.

CONCLUSIONS:
Oral fluid and blood samples provided very similar information regarding recent drug intake by randomly tested drivers and oral fluid yielded a higher detection rate for one drug (cocaine) than blood. Oral fluid can be considered a reliable alternative to blood as a matrix for drug testing.

PMID: 24345011 [PubMed - indexed for MEDLINE]

Concentrations of cocaine and benzoylecgonine in femoral blood from cocaine-related deaths compared with venous blood from impaired drivers.
Jones AW(1), Holmgren A.

The concentrations of cocaine and its major metabolite benzoylecgonine (BZE) were determined in femoral blood from 132 cocaine-related deaths and compared with venous blood from 988 apprehended drivers. Cocaine and BZE were determined by solid-phase extraction and isotope dilution gas chromatography-mass spectrometry with limits of quantitation of 0.02 mg/L for both substances. Significantly more men (95-98%) than women (2-5%) abused cocaine, although their mean age was about the same (29-30 years). Mean age (±SD) of cocaine-related deaths was 29 ± 7 years, which was not significantly different from 30 ± 8 years in traffic cases (P > 0.05). The median concentration of cocaine in blood in 61 fatalities was 0.10 mg/L compared with 0.06 mg/L in traffic cases (P < 0.001). In drug intoxication deaths, the median concentration of cocaine was 0.13 mg/L (N = 25), which was not significantly different from 0.09 mg/L (N = 36) in other causes of death. Cocaine-related deaths mostly involved mixed drug intoxications including co-ingestion of heroin, cannabis, amphetamines as well as legal drugs, such as benzodiazepines and/or ethanol. The concentrations of cocaine in blood from living and deceased persons overlapped, which makes it infeasible to predict toxicity from the analytical toxicology results alone.

PMID: 24327622 [PubMed - indexed for MEDLINE]

Addiction, drinking behavior, and driving under the influence.
Sloan FA(1), Eldred LM, Davis DV.

Using a survey of drinkers (N = 1,634), we evaluated alternative explanations of heavy and binge drinking, driving under the influence (DUI), DUI arrests, speeding citations, and chargeable accidents. Explanations included socializing, short-term decision-making, unrealistic optimism, risk preferring behavior, and addiction. Most consistent relationships were between substance use and alcohol addiction and dependent variables for (1) binge drinking and (2) DUI episodes. Respondent characteristics (age, marital and employment status, race, etc.) had important roles for DUI arrests.
Drinker-drivers and those arrested for DUI are partially overlapping groups with implications for
treatment and policies detecting and incapacitating persons from drinking and driving.

PMCID: PMC3976702 PMID: 24304171 [PubMed - indexed for MEDLINE]

Commentary: why is the odds ratio for involvement in serious road traffic accident among drunk
drivers in Norway and Finland higher than in other countries?
Gjerde H(1), Bogstrand ST, Lillsunde P.

OBJECTIVE:
Recent Norwegian and Finnish studies have found high odds ratios for serious or fatal injury in road
traffic accidents among drivers after drinking alcohol. In this report we have compared the odds
ratios with results from studies in other countries.

METHODS:
A literature review was conducted.

RESULTS:
The odds ratios were significantly higher than in countries where drunk driving is more common.

CONCLUSION:
The calculated odds ratios are not only related to alcohol use or blood alcohol concentration per se
but also related to the study design-for example, the inclusion of nonculpable drivers among cases-
and confounding factors not included in statistical analysis; for example, risk-taking behavior. Those
two issues may contribute to explaining why the reported odds ratios are higher for Norway and
Finland.

PMID: 24279959 [PubMed - indexed for MEDLINE]

Update: repeat DWI offenders involvement in fatal crashes in 2010. Fell JC(1).

OBJECTIVE:
This analysis is an update of a Traffic Tech published by the National
Highway Traffic Safety Administration (NHTSA) in March 1992. Drivers with prior driving-while-
intoxicated (DWI) convictions are overrepresented in fatal crashes and the relative risk of fatal crash
involvement is greater for these repeat DWI offenders.

METHODS:
Although it is estimated that 2.1 percent of licensed drivers had a prior arrest for DWI within the
past 3 years in 2010, 8.0 percent of intoxicated drivers (blood alcohol concentration [BAC] ≥ 0.08
g/dL) involved in fatal crashes had at least one prior DWI conviction in the past 3 years during that
same year.

RESULTS:
Drivers with prior DWI convictions are overrepresented in fatal crashes by a factor of 1.62 or are 62
percent more likely to be in a fatal crash. Similarly, drivers with prior DWI convictions are also
overrepresented as drinking drivers in fatal crashes: those with low BACs (0.01-0.07) by a factor of
2.38 and those with high BACs (0.08+) by a factor of 3.81.
CONCLUSION:
Though repeat DWI offenders are at a substantially higher risk of fatal crash involvement, the vast majority of intoxicated drivers in fatal crashes do not have a DWI conviction in the past 3 years (11 out of 12) according to the Fatality Analysis Reporting System records for the year 2010.

PMID: 24215097 [PubMed - indexed for MEDLINE]
Visual disorders

Does correcting astigmatism with toric lenses improve driving performance?
Cox DJ(1), Banton T, Record S, Grabman JH, Hawkins RJ.

PURPOSE:
Driving is a vision-based activity of daily living that impacts safety. Because visual disruption can compromise driving safety, contact lens wearers with astigmatism may pose a driving safety risk if they experience residual blur from spherical lenses that do not correct their astigmatism or if they experience blur from toric lenses that rotate excessively. Given that toric lens stabilization systems are continually improving, this preliminary study tested the hypothesis that astigmats wearing toric contact lenses, compared with spherical lenses, would exhibit better overall driving performance and driving-specific visual abilities.

METHODS:
A within-subject, single-blind, crossover, randomized design was used to evaluate driving performance in 11 young adults with astigmatism (-0.75 to -1.75 diopters cylinder). Each participant drove a highly immersive, virtual reality driving simulator (210 degrees field of view) with (1) no correction, (2) spherical contact lens correction (ACUVUE MOIST), and (3) toric contact lens correction (ACUVUE MOIST for Astigmatism). Tactical driving skills such as steering, speed management, and braking, as well as operational driving abilities such as visual acuity, contrast sensitivity, and foot and arm reaction time, were quantified.

RESULTS:
There was a main effect for type of correction on driving performance (p = 0.05). Correction with toric lenses resulted in significantly safer tactical driving performance than no correction (p < 0.05), whereas correction with spherical lenses did not differ in driving safety from no correction (p = 0.118). Operational tests differentiated corrected from uncorrected performance for both spherical (p = 0.008) and toric (p = 0.011) lenses, but they were not sensitive enough to differentiate toric from spherical lens conditions.

CONCLUSIONS:
Given previous research showing that deficits in these tactical skills are predictive of future real-world collisions, these preliminary data suggest that correcting low to moderate astigmatism with toric lenses may be important to driving safety. Their merits relative to spherical lens correction require further investigation.

PMID: 25946099 [PubMed - indexed for MEDLINE]

Vision, training hours, and road testing results in bioptic drivers.
Dougherty BE(1), Flom RE, Bullimore MA, Raasch TW.

PURPOSE:
Bioptic telescopic spectacles can be used by people with central visual acuity that does not meet the state standards to obtain an unrestricted driver's license. The purpose of this study was to examine the relationships among visual and demographic factors, training hours, and the results of road testing for bioptic drivers.
METHODS:
A retrospective study of patients who received an initial daylight bioptic examination at the Ohio State University and subsequently received a bioptic license was conducted. Data were collected on vision including visual acuity, contrast sensitivity, and visual field. Hours of driver training and results of Highway Patrol road testing were extracted from records. Relationships among vision, training hours, and road testing were analyzed.

RESULTS:
Ninety-seven patients who completed a vision examination between 2004 and 2008 and received daylight licensure with bioptic telescopic spectacles were included. Results of the first Highway Patrol road test were available for 74 patients. The median (interquartile range) hours of training before road testing was 21 (17) hours (range, 9 to 75 hours). Candidates without previous licensure were younger (p < 0.001) and had more documented training (p < 0.001). Lack of previous licensure and more training were significantly associated with having failed a portion of the Highway Patrol test and points deducted on the road test.

CONCLUSIONS:
New bioptic drivers without previous nonbioptic driving experience required more training and performed more poorly on road testing for licensure than those who had previous nonbioptic licensure. No visual factor was predictive of road testing results after adjustment for previous experience. The hours of training received remained predictive of road testing outcome even with adjustment for previous experience. These results suggest that previous experience and trainer assessments should be investigated as potential predictors of road safety in bioptic drivers in future studies.


Peripheral prism glasses: effects of moving and stationary backgrounds.
Shen J(1), Peli E, Bowers AR.

PURPOSE:
Unilateral peripheral prisms for homonymous hemianopia (HH) expand the visual field through peripheral binocular visual confusion, a stimulus for binocular rivalry that could lead to reduced predominance and partial suppression of the prism image, thereby limiting device functionality. Using natural-scene images and motion videos, we evaluated whether detection was reduced in binocular compared with monocular viewing.

METHODS:
Detection rates of nine participants with HH or quadranopia and normal binocularity wearing peripheral prisms were determined for static checkerboard perimetry targets briefly presented in the prism expansion area and the seeing hemifield. Perimetry was conducted under monocular and binocular viewing with targets presented over videos of real-world driving scenes and still frame images derived from those videos.

RESULTS:
With unilateral prisms, detection rates in the prism expansion area were significantly lower in binocular than in monocular (prism eye) viewing on the motion background (medians, 13 and 58%, respectively, p = 0.008) but not the still frame background (medians, 63 and 68%, p = 0.123). When the stimulus for binocular rivalry was reduced by fitting prisms bilaterally in one HH and one
normally sighted subject with simulated HH, prism-area detection rates on the motion background were not significantly different (p > 0.6) in binocular and monocular viewing.

CONCLUSIONS:
Conflicting binocular motion appears to be a stimulus for reduced predominance of the prism image in binocular viewing when using unilateral peripheral prisms. However, the effect was only found for relatively small targets. Further testing is needed to determine the extent to which this phenomenon might affect the functionality of unilateral peripheral prisms in more real-world situations.


Binocular visual field impairment in glaucoma and at-fault motor vehicle collisions.
McGwin G Jr(1), Huisingh C, Jain SG, Girkin CA, Owsley C.

PURPOSE:
To evaluate the association between the binocular visual field defects in drivers with glaucoma and the risk of motor vehicle collision (MVC) involvement.

METHODS:
A retrospective cohort study was conducted on 438 drivers with glaucoma aged 55 years or older using data from 1994 through 2000. Demographic, clinical, and driving characteristics were obtained from chart abstractions and patient survey. Binocular field measures were generated by combining data from the monocular (central 24-degree radius) fields whereby the binocular field measure was defined as the more sensitive point at each monocular field location. Measures included threshold (TH), total deviation (TD), and pattern deviation (PD); severe impairment in these measures was defined as falling into the worst quartile. MVC data were obtained from police records. Rate ratios (RR) and 95% confidence intervals (CI) were calculated.

RESULTS:
Drivers with severely impaired PD measures were twice as likely to have an at-fault MVC compared with those not severely impaired (RR, 2.13; 95% CI, 1.21-3.75); those with severely impaired TH (RR, 1.49; 95% CI, 0.81-2.74) and TD (RR, 1.50; 95% CI, 0.82-2.74) also had an increased rate of at-fault MVCs, although these were not significant. When the binocular central visual field was stratified into 9 regions, drivers with impaired TH, TD, or PD had similarly elevated MVC rates in all regions compared with those not severely impaired, though not all reached statistical significance.

CONCLUSIONS:
On the basis of clinical measures of visual field routinely used in the management of glaucoma, drivers with glaucoma with severe PD field defects in the binocular field have a higher rate of at-fault MVC compared with those with less impaired or unimpaired binocular visual fields.


[Requirements on vision for driving: to see more clearly]. [Article in French]
Mérour A(1), Favrat B, Borruat FX, Pasche C.

Primary care physicians have to assess visual functions essential for driving when determining medical fitness to drive. However, it can be difficult to apply the legal requirements that are
described in annex 1 of the ordinance regulating the admission to road traffic of 1976 (OAC) due to lack of unambiguousness. This article discusses those visual functions that have to be assessed namely visual acuity, the visual field and the detection of diplopia and it presents the appropriate methods for the primary care setting. Another objective is to discuss the relevance of road safety requirements on vision and to present the new Swiss requirements proposed for the future in comparison to some international recommendations.

PMID: 25562976 [PubMed - indexed for MEDLINE]

Impact of superior and inferior visual field loss on hazard detection in a computer-based driving test. Glen FC(1), Smith ND(1), Crabb DP(1).

PURPOSE:
Binocular visual field (VF) loss is linked to driving impairment, guiding authorities to implement fitness to drive requirements for VFs. Yet, evidence is limited regarding the specific types of VF defect that impede driving. This study used a novel gaze-contingent display to test the hypothesis that superior VF loss impacts detection of driving hazards more than inferior loss.

METHODS:
The Hazard Perception Test (HPT) is a computer-based component of the UK examination for learner drivers. It measures the response rate for detecting hazards in a series of real-life driving films, yielding a score out of 75, calculated based on the efficiency of detecting 15 hazards. Thirty UK drivers with healthy vision completed three versions of the HPT in a random order. In two versions, a computer set-up incorporating an eye-tracker modified a simulated VF defect in the superior and inferior VFs, respectively, according to the users' real-time gaze as they completed the HPT. The other version was unmodified to measure the baseline performance.

RESULTS:
Participants' mean score at baseline was 49/75 (SD=9). Mean (SD) performance fell by 18% (40(11)) when viewing films with a superior defect and 12% with an inferior defect (43(10)). These average differences were statistically significant (p<0.001; 95% CI for mean difference=1-7)

CONCLUSIONS:
In this study, simulated VF defects impaired the ability to detect driving hazards relative to participants' normal performances, with superior defects having more impact than inferior defects. These results could help inform the design of fairer tests of the VF component for fitness to drive.

PMID: 25425712 [PubMed - indexed for MEDLINE]

Car driving performance in hemianopia: an on-road driving study. de Haan GA(1), Melis-Dankers BJ(2), Brouwer WH(3), Bredewoud RA(4), Tucha O(5), Heutink J(1).

PURPOSE:
To study driving performance in people with homonymous hemianopia (HH) assessed in the official on-road test of practical fitness to drive by the Dutch driver's licensing authority (CBR).
METHODS:
Data were collected from a cohort (January 2010-July 2012) of all people with HH following the official relicensure trajectory at Royal Dutch Visio and the CBR in the Netherlands. Driving performance during the official on-road tests of practical fitness to drive was scored by professional experts on practical fitness to drive, using the visual impairments protocol and a standardized scoring of visual, tactical and operational aspects. Age ranged from 27 to 72 years (mean = 52, SD = 11.7) and time since onset of the visual field defect ranged from 6 to 41 months (mean = 15, SD = 7.5).

RESULTS:
Fourteen (54%) participants were judged as fit to drive. Besides poor visual scanning during driving, specific tactical, and operational weaknesses were observed in people with HH that were evaluated as unfit to drive. Results suggest that judgement on practical fitness to drive cannot be based on solely the visual field size. Visual scanning and operational handling of the car were found to be more impaired with longer time not driven, while such an effect was not found for tactical choices during driving.

CONCLUSIONS:
Training programs aimed at improving practical fitness to drive in people with HH should focus on improving both visual scanning, as well as driving aspects such as steering stability, speed adaptation, and anticipating environmental changes.

PMID: 25212777 [PubMed - indexed for MEDLINE]

Sleep-related eye symptoms and their potential for identifying driver sleepiness.
Filtness AJ(1), Anund A, Fors C, Ahlström C, Akerstedt T, Kecklund G.

The majority of individuals appear to have insight into their own sleepiness, but there is some evidence that this does not hold true for all, for example treated patients with obstructive sleep apnoea. Identification of sleep-related symptoms may help drivers determine their sleepiness, eye symptoms in particular show promise. Sixteen participants completed four motorway drives on two separate occasions. Drives were completed during daytime and night-time in both a driving simulator and on the real road. Ten eye symptoms were rated at the end of each drive, and compared with driving performance and subjective and objective sleep metrics recorded during driving. 'Eye strain', 'difficulty focusing', 'heavy eyelids' and 'difficulty keeping the eyes open' were identified as the four key sleep-related eye symptoms. Drives resulting in these eye symptoms were more likely to have high subjective sleepiness and more line crossings than drives where similar eye discomfort was not reported. Furthermore, drivers having unintentional line crossings were likely to have 'heavy eyelids' and 'difficulty keeping the eyes open'. Results suggest that drivers struggling to identify sleepiness could be assisted with the advice 'stop driving if you feel sleepy and/or have heavy eyelids or difficulty keeping your eyes open'.

PMID: 24861146 [PubMed - indexed for MEDLINE]

Characterizing functional complaints in patients seeking outpatient low-vision services in the United States.
PURPOSE:
To characterize functional complaints of new low-vision rehabilitation patients.

DESIGN:
Prospective observational study.

PARTICIPANTS:

METHODS:
New patients referred for low-vision rehabilitation were asked, "What are your chief complaints about your vision?" before their appointment. Full patient statements were transcribed as free text. Two methods assessed whether statements indicated difficulty in each of 13 functional categories: (1) assessment by 2 masked clinicians reading the statement, and (2) a computerized search of the text for specific words or word fragments. Logistic regression models were used to predict the influence of age, gender, and visual acuity on the likelihood of reporting a complaint in each functional category.

MAIN OUTCOME MEASURES:
Prevalence and risk factors for patient concerns within various functional categories.

RESULTS:
Reading was the most common functional complaint (66.4% of patients). Other functional difficulties expressed by at least 10% of patients included driving (27.8%), using visual assistive equipment (17.5%), mobility (16.3%), performing in-home activities (15.1%), lighting and glare (11.7%), and facial recognition and social interactions (10.3%). Good agreement was noted between the masked clinician graders and the computerized algorithm for categorization of functional complaints (median κ of 0.84 across the 13 categories). Multivariate logistic regression models demonstrated that the likelihood of reading difficulties increased mildly with age (odds ratio, 1.4 per 10-year increment in age; 95% confidence interval, 1.3-1.6), but did not differ with visual acuity (P = 0.09). Additionally, men were more likely to report driving difficulties and difficulties related to lighting, whereas women were more likely to report difficulty with either in-home activities or facial recognition or social interaction (P<0.05 for all). Mobility concerns, defined as walking difficulty and out-of-home activities, showed no relationship to gender, age, or visual acuity.

CONCLUSIONS:
Reading was the most commonly reported difficulty, regardless of the patient's diagnosis. Neither visual acuity nor gender were predictive of reading concerns, although, age showed a small effect. Addressing reading rehabilitation should be a cornerstone of low-vision therapy.

PMID: 24768243 [PubMed - indexed for MEDLINE]

Differential effects of refractive blur on day and nighttime driving performance.
Wood JM(1), Collins MJ, Chaparro A, Marszalek R, Carberry T, Lacherez P, Chu BS.

PURPOSE:
To investigate the effect of different levels of refractive blur on real-world driving performance measured under day and nighttime conditions.
METHODS:
Participants included 12 visually normal, young adults (mean age = 25.8 ± 5.2 years) who drove an instrumented research vehicle around a 4 km closed road circuit with three different levels of binocular spherical refractive blur (+0.50 diopter sphere [DS], +1.00 DS, +2.00 DS) compared with a baseline condition. The subjects wore optimal spherocylinder correction and the additional blur lenses were mounted in modified full-field goggles; the order of testing of the blur conditions was randomized. Driving performance was assessed in two different sessions under day and nighttime conditions and included measures of road signs recognized, hazard detection and avoidance, gap detection, lane-keeping, sign recognition distance, speed, and time to complete the course.

RESULTS:
Refractive blur and time of day had significant effects on driving performance (P < 0.05), where increasing blur and nighttime driving reduced performance on all driving tasks except gap judgment and lane keeping. There was also a significant interaction between blur and time of day (P < 0.05), such that the effects of blur were exacerbated under nighttime driving conditions; performance differences were evident even for +0.50 DS blur relative to baseline for some measures.

CONCLUSIONS:
The effects of blur were greatest under nighttime conditions, even for levels of binocular refractive blur as low as +0.50 DS. These results emphasize the importance of accurate and up-to-date refractive correction of even low levels of refractive error when driving at night.

PMID: 24618322 [PubMed - indexed for MEDLINE]


PURPOSE:
The ability of visually impaired people to deploy attention effectively to maximize use of their residual vision in dynamic situations is fundamental to safe mobility. We conducted a pilot study to evaluate whether tests of dynamic attention (multiple object tracking; MOT) and static attention (Useful Field of View; UFOV) were predictive of the ability of people with central field loss (CFL) to detect pedestrian hazards in simulated driving.

METHODS:
11 people with bilateral CFL (visual acuity 20/30-20/200) and 11 age-similar normally-sighted drivers participated. Dynamic and static attention were evaluated with brief, computer-based MOT and UFOV tasks, respectively. Dependent variables were the log speed threshold for 60% correct identification of targets (MOT) and the increase in the presentation duration for 75% correct identification of a central target when a concurrent peripheral task was added (UFOV divided and selective attention subtests). Participants drove in a simulator and pressed the horn whenever they detected pedestrians that walked or ran toward the road. The dependent variable was the proportion of timely reactions (could have stopped in time to avoid a collision).

RESULTS:
UFOV and MOT performance of CFL participants was poorer than that of controls, and the proportion of timely reactions was also lower (worse) (84% and 97%, respectively; p=0.001). For CFL participants, higher proportions of timely reactions correlated significantly with higher (better) MOT speed thresholds (r = 0.73, p = 0.01), with better performance on the UFOV divided and selective attention subtests (r = -0.66 and -0.62, respectively, p<0.04), with better
contrast sensitivity scores ($r = 0.54$, $p = 0.08$) and smaller scotomas ($r = -0.60$, $p = 0.05$).

**CONCLUSIONS:**
Our results suggest that brief laboratory-based tests of visual attention may provide useful measures of functional visual ability of individuals with CFL relevant to more complex mobility tasks.

**PMCID: PMC3928437 PMID: 24558495 [PubMed - indexed for MEDLINE]**

Driving with binocular visual field loss? A study on a supervised on-road parcours with simultaneous eye and head tracking.
Kasneci E(1), Sippel K(1), Aehling K(2), Heister M(2), Rosenstiel W(1), Schiefer U(3), Papageorgiou E(4).

Post-chiasmal visual pathway lesions and glaucomatous optic neuropathy cause binocular visual field defects (VFDs) that may critically interfere with quality of life and driving licensure. The aims of this study were (i) to assess the on-road driving performance of patients suffering from binocular visual field loss using a dual-brake vehicle, and (ii) to investigate the related compensatory mechanisms. A driving instructor, blinded to the participants' diagnosis, rated the driving performance (passed/failed) of ten patients with homonymous visual field defects (HP), including four patients with right (HR) and six patients with left homonymous visual field defects (HL), ten glaucoma patients (GP), and twenty age and gender-related ophthalmologically healthy control subjects (C) during a 40-minute driving task on a pre-specified public on-road parcours. In order to investigate the subjects' visual exploration ability, eye movements were recorded by means of a mobile eye tracker. Two additional cameras were used to monitor the driving scene and record head and shoulder movements. Thus this study is novel as a quantitative assessment of eye movements and an additional evaluation of head and shoulder was performed. Six out of ten HP and four out of ten GP were rated as fit to drive by the driving instructor, despite their binocular visual field loss. Three out of 20 control subjects failed the on-road assessment. The extent of the visual field defect was of minor importance with regard to the driving performance. The site of the homonymous visual field defect (HVFD) critically interfered with the driving ability: all failed HP subjects suffered from left homonymous visual field loss (HL) due to right hemispheric lesions. Patients who failed the driving assessment had mainly difficulties with lane keeping and gap judgment ability. Patients who passed the test displayed different exploration patterns than those who failed. Patients who passed focused longer on the central area of the visual field than patients who failed the test. In addition, patients who passed the test performed more glances towards the area of their visual field defect. In conclusion, our findings support the hypothesis that the extent of visual field per se cannot predict driving fitness, because some patients with HVFDs and advanced glaucoma can compensate for their deficit by effective visual scanning. Head movements appeared to be superior to eye and shoulder movements in predicting the outcome of the driving test under the present study scenario.

**PMCID: PMC3921141 PMID: 24523869 [PubMed - indexed for MEDLINE]**

Driving with hemianopia: IV. Head scanning and detection at intersections in a simulator.
Bowers AR(1), Ananyev E, Mandel AJ, Goldstein RB, Peli E.
PURPOSE:
Using a driving simulator, we examined the effects of homonymous hemianopia (HH) on head scanning behaviors at intersections and evaluated the role of inadequate head scanning in detection failures.

METHODS:
Fourteen people with complete HH and without cognitive decline or visual neglect and 12 normally sighted (NV) current drivers participated. They drove in an urban environment following predetermined routes, which included multiple intersections. Head scanning behaviors were quantified at T-intersections (n = 32) with a stop or yield sign. Participants also performed a pedestrian detection task. The relationship between head scanning and detection was examined at 10 intersections.

RESULTS:
For HH drivers, the first scan was more likely to be toward the blind than the seeing hemifield. They also made a greater proportion of head scans overall to the blind side than did the NV drivers to the corresponding side (P = 0.003). However, head scan magnitudes of HH drivers were smaller than those of the NV group (P < 0.001). Drivers with HH had impaired detection of blind-side pedestrians due either to not scanning in the direction of the pedestrian or to an insufficient scan magnitude (left HH detected only 46% and right HH 8% at the extreme left and right of the intersection, respectively).

CONCLUSIONS:
Drivers with HH demonstrated compensatory head scan patterns, but not scan magnitudes. Inadequate scanning resulted in blind-side detection failures, which might place HH drivers at increased risk for collisions at intersections. Scanning training tailored to specific problem areas identified in this study might be beneficial.

PMCID: PMC3954314 PMID: 24474265 [PubMed - indexed for MEDLINE]

Visually impaired drivers who use bioptic telescopes: self-assessed driving skills and agreement with on-road driving evaluation.
Owsley C(1), McGwin G Jr, Elgin J, Wood JM.

PURPOSE:
To compare self-assessed driving habits and skills of licensed drivers with central visual loss who use bioptic telescopes to those of age-matched normally sighted drivers, and to examine the association between bioptic drivers' impressions of the quality of their driving and ratings by a "backseat" evaluator.

METHODS:
Participants were licensed bioptic drivers (n = 23) and age-matched normally sighted drivers (n = 23). A questionnaire was administered addressing driving difficulty, space, quality, exposure, and, for bioptic drivers, whether the telescope was helpful in on-road situations. Visual acuity and contrast sensitivity were assessed. Information on ocular diagnosis, telescope characteristics, and bioptic driving experience was collected from the medical record or in interview. On-road driving performance in regular traffic conditions was rated independently by two evaluators.
RESULTS:
Like normally sighted drivers, bioptic drivers reported no or little difficulty in many driving situations (e.g., left turns, rush hour), but reported more difficulty under poor visibility conditions and in unfamiliar areas (P < 0.05). Driving exposure was reduced in bioptic drivers (driving 250 miles per week on average vs. 410 miles per week for normally sighted drivers, P = 0.02), but driving space was similar to that of normally sighted drivers (P = 0.29). All but one bioptic driver used the telescope in at least one driving task, and 56% used the telescope in three or more tasks. Bioptic drivers’ judgments about the quality of their driving were very similar to backseat evaluators’ ratings.

CONCLUSIONS:
Bioptic drivers show insight into the overall quality of their driving and areas in which they experience driving difficulty. They report using the bioptic telescope while driving, contrary to previous claims that it is primarily used to pass the vision screening test at licensure.

PMCID: PMC3894796 PMID: 24370830 [PubMed - indexed for MEDLINE]


PURPOSE:
To compare blind-side detection performance of drivers with homonymous hemianopia (HH) for stationary and approaching pedestrians, initially appearing at small (4°) or large (14°) eccentricities in a driving simulator. While the stationary pedestrians did not represent an imminent threat, as their eccentricity increased rapidly as the vehicle advanced, the approaching pedestrians maintained a collision course with approximately constant eccentricity, walking or running, toward the travel lane as if to cross.

METHODS:
Twelve participants with complete HH and without spatial neglect pressed the horn whenever they detected a pedestrian while driving along predetermined routes in two driving simulator sessions. Miss rates and reaction times were analyzed for 52 stationary and 52 approaching pedestrians.

RESULTS:
Miss rates were higher and reaction times longer on the blind than the seeing side (P < 0.01). On the blind side, miss rates were lower for approaching than stationary pedestrians (16% vs. 29%, P = 0.01), especially at larger eccentricities (20% vs. 54%, P = 0.005), but reaction times for approaching pedestrians were longer (1.72 vs. 1.41 seconds; P = 0.03). Overall, the proportion of potential blind-side collisions (missed and late responses) was not different for the two paradigms (41% vs. 35%, P = 0.48), and significantly higher than for the seeing side (3%, P = 0.002).

CONCLUSIONS:
In a realistic pedestrian detection task, drivers with HH exhibited significant blind-side detection deficits. Even when approaching pedestrians were detected, responses were often too late to avoid a potential collision.

PMCID: PMC3900270 PMID: 24346175 [PubMed - indexed for MEDLINE]

OBJECTIVE:
To determine if central visual loss is associated with driving cessation, driving restriction, or other-driver preference.

DESIGN:
Cross-sectional study.

PARTICIPANTS:
Sixty-four subjects with bilateral visual loss (<20/32 in better eye) or severe unilateral visual loss (<20/200) from age-related macular degeneration (AMD) and 58 normally sighted controls between 60 and 80 years of age.

METHODS:
Participants self-reported driving habits. Other-driver preference was defined as preferring that another drive when there is more than 1 driver in the car. Subjects reporting 2 or more driving limitations were considered to have restricted their driving.

MAIN OUTCOME MEASURES:
Self-reported driving cessation, other-driver preference, and driving restriction.

RESULTS:
Age-related macular degeneration subjects were older (74.7 vs. 69.7 years), had worse visual acuity (VA; mean better-eye VA, 0.43 vs. 0.08 logarithm of minimum angle of resolution [logMAR]) and contrast sensitivity (CS; 1.4 vs. 1.9 log units of CS [logCS]), and were more likely to be white when compared with controls (P<0.001 for all). Drivers with AMD-related vision loss were more likely to avoid driving over longer distances, beyond 1 hour, at night, and in unfamiliar conditions (P < 0.05 for all). In multivariate models, driving cessation was associated with worse better-eye VA (odds ratio [OR], 1.5 per 1-line decrement in VA; P<0.001) and worse binocular CS (OR, 1.36 per 0.1 logCS increment; P = 0.005); however, AMD group status was not associated with driving cessation (OR, 1.9; P = 0.35). Factors predicting driving restriction were AMD (OR, 9.0; P = 0.004), worse vision (OR, 2.5 per line of VA loss; P<0.001), lower CS (OR, 2.2 per 0.1-logCS increment; P<0.001), and female gender (OR, 27.9; P = 0.002). Other-driver preference was more common with worse vision (OR, 1.6 per 0.1-logMAR increment; P = 0.003), female gender (OR, 4.5; P = 0.02), and being married (OR, 3.8; P = 0.04).

CONCLUSIONS:
Most patients with AMD-related central vision loss continue to drive, but demonstrate significant driving restrictions, especially with more severe VA and CS loss. Future work should determine which driving adaptations the visually impaired best balance safety and independence.

PMCID: PMC3943660 PMID: 24290805 [PubMed - indexed for MEDLINE]

Wilhelm H(1), Peters T, Durst W, Roelcke S, Quast R, Hütten M, Wilhelm B.

BACKGROUND:
Hitherto recommendations and thresholds for contrast tests are available for mesopic but not for photopic methods. While mesopic tests are widespread in ophthalmology, in occupational medicine photopic contrast tests are often used. With regard to the attachment 6 of the German
Fahrerlaubnisverordnung (FeV) which is relevant since July 2011 we tested the specificity and sensitivity as well as the test-retest reliability of available test devices and defined cut-off values.

METHODS:
We examined patients with medium opacities, healthy volunteers and a sample of employees. Optovist EU, Binoptometer 4P and Pelli-Robson charts with standardised illumination were applied for contrast sensitivity testing. All these methods were compared to the Mesotest II as gold standard. We followed the recommendations of the German Qualitätssicherungs-Kommission der Deutschen Ophthalmologischen Gesellschaft (DOG) for contrast vision testing and definition of cut-off values.

RESULTS:
64 patients with cataract (age 42-70 years, median 62 years), 50 pilots (age 40-69 years, median 53.5 years) and 109 employees of a transportation company (age 40-59 years, median 50 years) were included in the trial. All contrast sensitivity tests showed a good sensitivity and specificity (AUC 0.86 to 0.99). For Optovist EU and Binoptometer 4P a threshold of 15% Weber contrast is recommended for examinations according to FeV. The test-retest reliability was high in all methods with highly significant Pearson correlation coefficients of 0.77 to 0.94 and a repeatability coefficient between 0.08 und 0.4. The standard distance of 1 m common for the Pelli-Robson chart cannot be recommended for FeV examinations, while the results at 3 m distance are comparable to those of the other contrast vision tests. The preliminary cut-off for the Pelli-Robson chart at 3 m distance is 1.65.

CONCLUSIONS:
Cut-off values for the lawful assessment of applicants are now available. Both Binoptometer 4P and Optovist EU proved to be appropriate and – as expected due to comparable technical properties - the same cut-off can be recommended. At 1 m distance the Pelli-Robson chart is not sensitive enough. Because the new distance of 3 m for the Pelli-Robson chart was investigated in 55 cataract patients and 10 pilots in this trial, a confirmatory trial for this distance is planned.

PMID: 24190829 [PubMed - indexed for MEDLINE]

Prado Vega R(1), van Leeuwen PM, Rendón Vélez E, Lemij HG, de Winter JC.

The objective of this study was to evaluate differences in driving performance, visual detection performance, and eye-scanning behavior between glaucoma patients and control participants without glaucoma. Glaucoma patients (n = 23) and control participants (n = 12) completed four 5 min driving sessions in a simulator. The participants were instructed to maintain the car in the right lane of a two-lane highway while their speed was automatically maintained at 100 km/h. Additional tasks per session were: Session 1: none, Session 2: verbalization of projected letters, Session 3: avoidance of static obstacles, and Session 4: combined letter verbalization and avoidance of static obstacles. Eye-scanning behavior was recorded with an eye-tracker. Results showed no statistically significant differences between patients and control participants for lane keeping, obstacle avoidance, and eye-scanning behavior. Steering activity, number of missed letters, and letter reaction time were significantly higher for glaucoma patients than for control participants. In conclusion, glaucoma patients were able to avoid objects and maintain a nominal lane keeping performance, but applied more steering input than control participants, and were more likely than control participants to miss peripherally projected stimuli. The eye-tracking results
suggest that glaucoma patients did not use extra visual search to compensate for their visual field loss. Limitations of the study, such as small sample size, are discussed.

**PMCID:** PMC3797776 **PMID:** 24146975 [PubMed - indexed for MEDLINE]

Patients with homonymous hemianopia become visually qualified to drive using novel monocular sector prisms.
Moss AM(1), Harrison AR, Lee MS.

Patients with homonymous hemianopia (HH) often fail to meet visual field (VF) requirements for a driver’s license. We describe 2 patients with complete HH, who met the minimum VF requirements for driving using a novel, high-power, monocular sector prism system. Baseline VFs were assessed using automated and kinetic perimetry. Patients were fitted with glasses and press-on 57-PD peripheral monocular sector prisms placed on the lens ipsilateral to the VF defect above and below the visual axis with prisms oriented obliquely. Kinetic perimetry was reassessed both monocularly and binocularly, with and without prisms. The 2 patients had 95° and 82° angle of continuous, horizontal, binocular VF. With the use of the prism system, the binocular VF increased to 115° and 112° angles. Both patients reported improvement in quality of life and each holds a valid driver’s license and has successfully operated a motor vehicle without any restrictions or accidents. These findings suggest that the addition of oblique 57-PD prisms to the ipsilateral spectacle lens above and below the visual axis for patients with complete HH can significantly increase horizontal VF, which may help an individual become visually qualified to obtain a driver’s license.

**PMID:** 24135970 [PubMed - indexed for MEDLINE]

Evaluating the benefits of second-eye cataract surgery among the elderly.
Ishikawa T(1), Desapriya E, Puri M, Kerr JM, Hewapathirane DS, Pike I.

The aim of this systematic review was to synthesize and appraise the evidence of benefits of second-eye cataract extraction for visual function, patient-reported quality of life, falls, and driving ability among the elderly. We conducted a comprehensive search in MEDLINE using "surgery," "cataract extraction," "second eye," and "bilateral." Ten studies met the inclusion and quality criteria. We found "moderate" evidence supporting improvement in stereopsis, stereoacuity, and anisometropia over and above the benefits of first-eye surgery. We also found "moderate" evidence supporting improvement in visual acuity, contrast sensitivity, and self-reported visual functioning. Studies included in the review do not provide definitive evidence of second-eye surgery benefits on health-related quality of life, visual fields, falls prevention, and driving performance. However, the heterogeneity of outcome measures and the limited number of studies likely contributed to our findings. The findings have implications for clinicians and policymakers in the health-care industry and emphasize the need for additional trials examining this important and widely performed clinical procedure. FINANCIAL DISCLOSURE: No author has a financial or proprietary interest in any material or method mentioned.

**PMID:** 24075161 [PubMed - indexed for MEDLINE]
Fraser ML(1), Meuleners LB, Ng JQ, Morlet N.

BACKGROUND:
Cataract is an extremely common visual condition of ageing. Evidence suggests that visual impairment influences driving patterns and self-regulatory behavior among older drivers. However, little is known about the psychological effects of driver self-regulation among older drivers. Therefore, this study aimed to describe driver self-regulation practices among older bilateral cataract patients and to determine the association between self-regulation and depressive symptoms.

METHODS:
Ninety-nine older drivers with bilateral cataract were assessed the week before first eye cataract surgery. Driver self-regulation was measured via the Driving Habits Questionnaire. Depressive symptoms were assessed using the 20-item Center for Epidemiological Studies Depression Scale. Visual, demographic and cognitive data were also collected. Differences between self-regulators and non self-regulators were described and linear regression modeling used to determine the association between driver self-regulation and depressive symptoms score.

RESULTS:
Among cataract patients, 48% reported self-regulating their driving to avoid at least one challenging situation. The situations most commonly avoided were driving at night (40%), on the freeway (12%), in the rain (9%) and parallel parking (8%). Self-regulators had significantly poorer contrast sensitivity in their worse eye than non self-regulators (p = 0.027). Driver self-regulation was significantly associated with increased depressive symptoms after controlling for potential confounding factors (p = 0.002).

CONCLUSIONS:
Driver self-regulation was associated with increased depressive symptoms among cataract patients. Further research should investigate this association among the general older population. Self-regulation programs aimed at older drivers may need to incorporate mental health elements to counteract unintended psychological effects.

PMCID: PMC3847094 PMID: 24016307 [PubMed - indexed for MEDLINE]

Gender differences in adapting driving behavior to accommodate visual health limitations.
Sarkin AJ(1), Tally SR, Wooldridge JS, Choi K, Shieh M, Kaplan RM.

This study investigated whether men and women are equally likely to adapt their driving behaviors in response to visual limitations. Participants were 376 (222 women and 154 men) pre-surgical cataract patients from the Shiley Eye Center in La Jolla, California. All participants completed the National Eye Institute Visual Functioning Questionnaire, which assesses self-reported visual symptoms, functional limitations, and behaviors including driving during the day, at night, or in difficult conditions. Visual acuity was assessed using the log of the minimal angle of resolution (LogMAR) scale. There were no significant differences in LogMAR visual acuity between men and women who reported either that they stopped driving at night because of visual impairment or reported having no difficulty driving at night. Of participants who reported having difficulty driving at night, mean weighted LogMAR scores indicated significantly better visual acuity for women than
There were no significant differences in LogMAR visual acuity between women and men in any of the difficult driving condition categories. Significantly more women than men reported that they stopped driving in difficult conditions because of eyesight, despite the lack of gender differences in visual acuity for this sample. We found no evidence that cataract disease had different effects on the visual acuity of older adult men and women. However, there was a significant difference between genders in self-reported driving behavior. It is possible that some women are more cautious or have less need to drive. However, failing to adapt driving behaviors to accommodate visual limitations may represent a potential behavioral public health risk for men.

PMID: 23852327 [PubMed - indexed for MEDLINE]


BACKGROUND:
Little is known about motor vehicle collision (MVC) risk in older drivers with age-related macular degeneration (AMD). The purpose of this study is to examine associations between MVC involvement and AMD presence and severity.

METHODS:
In a retrospective cohort study pooling the samples from four previous studies, we examined associations between MVC rate and older drivers with early, intermediate or advanced AMD as compared with those in normal eye health. MVC data were based on accident reports obtained from the state agency that compiles this information.

RESULTS:
MVC rate was highest among those in normal eye health and progressively declined among those with early and intermediate disease, and then increased for those with advanced AMD. However, only for drivers with intermediate AMD was the MVC rate significantly different (lower) as compared with those in normal eye health, regardless of whether the rate was defined in terms of person-years (RR 0.34, 95% CI 0.13 to 0.89) or person-miles (RR 0.35, 95% CI 0.13 to 0.91) of driving.

CONCLUSIONS:
These results suggest that older drivers with intermediate AMD have a reduced risk of collision involvement. Further research should investigate whether self-regulatory driving practices by these drivers (avoiding challenging driving situations) underlies this reduced risk.

PMCID: PMC3837568 PMID: 23832967 [PubMed - indexed for MEDLINE]
Respiratory and sleep disorders


We evaluated clinicians' current practice for giving advice to patients with obstructive sleep apnoea syndrome. Clinicians were invited to complete a web-based survey and indicate the advice they would give to patients in a number of scenarios about driving; they were also asked what they considered to be residual drowsiness and adequate compliance following CPAP treatment. In the least contentious scenario, 94% of clinicians would allow driving; in the most contentious a patient had a 50% chance of being allowed to drive. Following treatment with CPAP, clinicians' interpretation of what constituted residual drowsiness was inconsistent. In each vignette the same clinician was more likely to say 'yes' to 'excessive' than to 'irresistible' (71%±12% vs 42%±10%, p=0.0045). There was also a lack of consensus regarding 'adequate CPAP compliance'; 'yes' responses ranged from 13% to 64%. There is a need for clearer guidance; a recent update to the Driver and Vehicle Licensing Agency guidance, and a statement from the British Thoracic Society, making it clear that sleepiness while driving is the key issue, may help.

PMID: 25410186 [PubMed - indexed for MEDLINE]


Obstructive sleep apnea is associated with increased motor vehicle accident risk, and improved detection of patients at risk is of importance. The present study addresses potential risk factors in the European Sleep Apnea Database and includes patients with suspected obstructive sleep apnea [n = 8476, age 51.5 (12.5) years, body mass index 31.0 (6.6) kg m(-2), 82.4% driver's licence holders]. Driving distance (km year(-1) ), driver's licence type, sleep apnea severity, sleepiness and comorbidities were assessed. Previously validated risk factors for accident history: Epworth Sleepiness Scale ≥16; habitual sleep time ≤5 h; use of hypnotics; and driving ≥15 000 km year(-1) were analysed across European regions. At least one risk factor was identified in male and female drivers, 68.75 and 51.3%, respectively. The occurrence of the risk factors was similar across Europe, with only a lower rate in the eastern region (P = 0.001). The mean number of risk factors increased across classes of sleep apnea severity. Frequent driving was prevalent [14.0 (interquartile range 8.0-20.0) × 10(3) km year(-1) ] and 32.7% of drivers had severe obstructive sleep apnea [apnea-hypopnea index 50.3 (38.8-66.0) n h(-1) ]. Obesity, shorter sleep time and younger age were associated with increased traffic exposure (P ≤ 0.03). In conclusion, the risk factors associated with accident history were common among European patients with suspected obstructive sleep apnea,
but varied between geographical regions. There was a weak covariation between occurrence of risk factors and clinically determined apnea severity but frequent driving, a strong risk factor for accidents, was over-represented. Systematic evaluation of accident-related risk factors is important to detect sleep apnea patients at risk for motor vehicle accidents.

PMID: 25040185 [PubMed - indexed for MEDLINE]

Individual variability and predictors of driving simulator impairment in patients with obstructive sleep apnea.
Vakulin A(1), Catcheside PG(2), Baulk SD(3), Antic NA(2), Banks S(4), Dorrian J(4), McEvoy RD(2).

STUDY OBJECTIVES:
Obstructive sleep apnea (OSA) is associated with driving impairment and road crashes. However, daytime function varies widely between patients presenting a clinical challenge when assessing crash risk. This study aimed to determine the proportion of patients showing "normal" versus "abnormal" driving simulator performance and examine whether anthropometric, clinical, and neurobehavioral measures predict abnormal driving.

METHODS:
Thirty-eight OSA patients performed a 90-min simulated driving task under 3 conditions: normal sleep, restricted sleep (4 h in bed), and normal sleep + alcohol (BAC ∼0.05 g/dL). Patients were classified as "resilient" drivers if, under all 3 experimental conditions their mean steering deviation fell within 2 standard deviations of the mean steering deviation of 20 controls driving under baseline normal sleep conditions, or a "vulnerable" driver if mean steering deviation was outside this range in at least one experimental condition. Potentially predictive baseline anthropometric, clinical, neurocognitive, and cortical activation measures were examined.

RESULTS:
Of the 38 OSA patients examined, 23 (61%) and 15 (39%) were classified as resilient and vulnerable drivers, respectively. There were no differences in baseline measures between the groups, although the proportion of females was greater and self-reported weekly driving exposure was less among vulnerable drivers (p < 0.05). On univariate analysis gender, weekly driving hours, and auditory event related potential P2 amplitude were weakly associated with group status. Multivariate analysis showed weekly driving hours (OR 0.69, 95%CI, 0.51-0.94, p = 0.02) and P2 amplitude (OR 1.34, 95%CI 1.02-1.76, p = 0.035) independently predicted vulnerable drivers.

CONCLUSIONS:
Most OSA patients demonstrated normal simulated driving performance despite exposure to further sleep loss or alcohol. Most baseline measures did not differentiate between resilient and vulnerable drivers, although prior driving experience and cortical function were predictive. Novel measures to assist identification of OSA patients at risk of driving impairment and possibly accidents are needed.

TRIAL REGISTRATION:
Data presented in this manuscript was collected as part of a clinical trial "Experimental Investigations of Driving Impairment in Obstructive Sleep Apnea." Trial ID: ACTRN12610000009011, URL: http://www.anzctr.org.au/trial_view.aspx?ID=334979.

PMCID: PMC4031406 PMID: 24932145 [PubMed - indexed for MEDLINE]
Evaluation of candidate measures for home-based screening of sleep disordered breathing in Taiwanese bus drivers.

Ting H(1), Huang RJ(2), Lai CH(3), Chang SW(4), Chung AH(5), Kuo TY(6), Chang CH(7), Shih TS(8), Lee SD(9).

BACKGROUND:
Sleepiness-at-the-wheel has been identified as a major cause of highway accidents. The aim of our study is identifying the candidate measures for home-based screening of sleep disordered breathing in Taiwanese bus drivers, instead of polysomnography.

METHODS:
Overnight polysomnography accompanied with simultaneous measurements of alternative screening devices (pulse oximetry, ApneaLink, and Actigraphy), heart rate variability, wake-up systolic blood pressure and questionnaires were completed by 151 eligible participants who were long-haul bus drivers with a duty period of more than 12 h a day and duty shifting.

RESULTS:
63.6% of professional bus drivers were diagnosed as having sleep disordered breathing and had a higher body mass index, neck circumference, systolic blood pressure, arousal index and desaturation index than those professional bus drivers without evidence of sleep disordered breathing. Simple home-based candidate measures: (1) Pulse oximetry, oxygen-desaturation indices by ≥3% and 4% (r = 0.87~0.92); (2) Pulse oximetry, pulse-rising indices by ≥7% and 8% from a baseline (r = 0.61~0.89); and (3) ApneaLink airflow detection, apnea-hypopnea indices (r = 0.70~0.70), based on recording-time or Actigraphy-corrected total sleep time were all significantly correlated with, and had high agreement with, corresponding polysomnographic apnea-hypopnea indices [(1) 94.5%~96.6%, (2) 93.8%~97.2%, (3) 91.1%~91.3%, respectively]. Conversely, no validities of SDB screening were found in the multi-variables apnea prediction questionnaire, Epworth Sleepiness Scale, night-sleep heart rate variability, wake-up systolic blood pressure and anthropometric variables.

CONCLUSIONS:
The indices of pulse oximetry and apnea flow detection are eligible criteria for home-based screening of sleep disordered breathing, specifically for professional drivers.

PMCID: PMC4063033 PMID: 24803198 [PubMed - indexed for MEDLINE]

Obstructive sleep apnea and driving: A Canadian Thoracic Society and Canadian Sleep Society position paper.

Untreated patients with obstructive sleep apnea (OSA) are at increased risk for motor vehicle collisions; however, it is unclear how this should be translated into fitness-to-drive recommendations. Accordingly, the Canadian Thoracic Society (CTS) Sleep Disordered Breathing Clinical Assembly and the Canadian Sleep Society (CSS) assembled a CTS-CSS working group to propose recommendations with regard to driving in patients with OSA. Recommendations for assessing fitness to drive in noncommercial drivers: 1. Severity of OSA alone is not a reliable predictor of collision risk and, therefore, should not be used in isolation to assess fitness
to drive; 2. The severity of sleep apnea should be considered in the context of other factors to assess fitness to drive; 3. The decision to restrict driving is ultimately made by the motor vehicle licensing authority; however, they should take into account the information and recommendations provided by the sleep medicine physician and should follow provincial guidelines; 4. For patients prescribed continuous positive airway pressure (CPAP) therapy, objective CPAP compliance should be documented. Efficacy should also be documented in terms of reversing the symptoms and improvement in sleep apnea based on physiological monitoring; 5. For patients treated with surgery or an oral appliance, verification of adequate sleep apnea treatment should be obtained; and 6. A driver diagnosed with OSA may be recertified as fit to drive based on assessment of symptoms and demonstrating compliance with treatment. The assessment should be aligned with the provincial driver's license renewal period. Commercial vehicles: Assessment of fitness to drive should be more stringent for patients operating commercial vehicles. In general, the CTS-CSS working group was in agreement with the Medical Expert Panel recommendations to the Federal Motor Carrier Safety Administration in the United States; these recommendations were adapted for Canadian practitioners.

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The most common medical cause of excessive daytime sleepiness (EDS) is obstructive sleep apnea (OSA). Specifically, among an estimated 14 million US commercial drivers, 17-28% or 2.4 to 3.9 million are expected to have OSA. Based on existing epidemiologic evidence, most of these drivers are undiagnosed and not adequately treated. Untreated OSA increases the risk of vehicular crashes as documented in multiple independent studies and by meta-analysis. Therefore, identifying commercial drivers with OSA and having them effectively treated should decrease crash-related fatalities and injuries. Several strategies are available for screening and identifying drivers with OSA. The simplest and most effective objective strategies use body mass index (BMI) cutoffs for obesity. Functional screens are promising adjuncts to other objective tests. The most effective approach will likely be a combination of a good questionnaire; BMI measures; and a careful physician-obtained history complemented by a functional screen.
Sleep disorders, sleepiness, and near-miss accidents among long-distance highway drivers in the summertime.
Quera Salva MA(1), Barbot F(2), Hartley S(3), Sauvagnac R(4), Vaugier I(2), Lofaso F(5), Philip P(6).

OBJECTIVE:
We aimed to investigate sleepiness, sleep hygiene, sleep disorders, and driving risk among highway drivers.

METHODS:
We collected data using cross-sectional surveys, including the Epworth Sleepiness Scale (ESS) questionnaire, Basic Nordic Sleep Questionnaire (BNSQ), and a travel questionnaire; we also obtained sleep data from the past 24 h and information on usual sleep schedules. Police officers invited automobile drivers to participate.

RESULTS:
There were 3051 drivers (mean age, 46±13 y; 75% men) who completed the survey (80% participation rate). Eighty-seven (2.9%) drivers reported near-miss sleepy accidents (NMSA) during the trip; 8.5% of NMSA occurred during the past year and 2.3% reported sleepiness-related accidents occurring in the past year. Mean driving time was 181±109 min and mean sleep duration in the past 24 h was 480±104 min; mean sleep duration during workweeks was 468±74 min. Significant risk factors for NMSA during the trip were NMSA in the past year, nonrestorative sleep and snoring in the past 3 months, and sleepiness during the interview. Neither sleep time in the past 24 h nor acute sleep debt (sleep time difference between workweeks and the past 24 h) correlated with the occurrence of near misses.

CONCLUSIONS:
Unlike previous studies, acute sleep loss no longer explains sleepiness at the wheel. Sleep-related breathing disorders or nonrestorative sleep help to explain NMSA more adequately than acute sleep loss.

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Obstructive sleep apnea syndrome; a neglected cause of traffic collision among Iranian public transport drivers.
Khazaie H(1), Maroufi A.

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